INVESTIGATION INTO THE ELEMENTS CONTRIBUTING TO THE CONSTRUCTS OF SENSE OF COHERENCE AND HARDINESS WITH PARTICULAR REFERENCE TO CLINICAL UTILITY

LINDA M. GIBSON, M.Sc.

This thesis is submitted in fulfilment of the requirements of the University of Abertay, Dundee, for the degree of Doctor of Philosophy.

August 1999

I certify that this thesis is the true and accurate version of the thesis approved by the examiners.

_____(Signature) _____(Date)

(Director of Studies)

I, Linda Gibson, declare that the following work is my own and was completed under the supervision of Dr Malcolm Cook, Dr Leona Elder and Dr Eva Forbes.

Signature [redacted]

Date 29-11-98

CONTENTS

Page

Chapter 1 **CONTENTS**

Page

INTRODUCTION AND BACKGROUND RESEARCH

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

Chapter 8

CONTENTS

CONTENTS

CONTENTS

TABLES Page

CONTENTS

TABLES Page

Chapter 5

CONTENTS

CONTENTS

TABLES Page

Chapter 6

CONTENTS

TABLES Page

CONTENTS

TABLES Page

CONTENTS

TABLES **Page**

Chapter 8

CONTENTS

CONTENTS

FIGURES **Page**

CONTENTS

CONTENTS

FIGURES **Page**

ABSTRACT

Sense of Coherence consists of 3 dimensions; comprehensibility, manageability and meaningfulness and Hardiness consists of dimensions; control, challenge and commitment. These are considered to be personal approaches to life which increase resilience, both improving and prolonging health. They have been widely accepted by the psychological community and used in both clinical and occupational settings. Despite their wide appeal however, there appear to be considerable questions surrounding their validity.

The validity and clinical utility of these 2 questionnaires was examined in relation to personality using the Eysenck Personality Inventory and to psychological well-being using the General Health Questionnaire 12 -item version.

Data were collected from university students, Open University students, and a group of men from mixed occupational backgrounds such as Social Services, Police, National Health Service. These were examined using correlational statistics, differences, distributions, non-linear relationships, and Confirmatory Factor Analysis.

Findings suggested that personality may be a confounding variable in the measurement of the these constructs and that this may explain the relationship with psychological health. Sex differences were also found in the scores and were considered as a possible extraneous variable in interpretation of findings which are based on mixed sex data. The factor structure of each questionnaire was found to be inconsistent with those proposed by the original authors and it was recommended that the measures should not be used clinically in their present form.

ABSTRACT

Sense of Coherence consists of 3 dimensions; comprehensibility, manageability and meaningfulness and Hardiness consists of dimensions; control, challenge and commitment. These are considered to be personal approaches to life which increase resilience, both improving and prolonging health. They have been widely accepted by the psychological community and used in both clinical and occupational settings. Despite their wide appeal however, there appear to be considerable questions surrounding their validity.

The validity and clinical utility of these 2 questionnaires was examined in relation to personality using the Eysenck Personality Inventory and to psychological well-being using the General Health Questionnaire 12 -item version.

Data were collected from university students, Open University students, and a group of men from mixed occupational backgrounds such as Social Services, Police, National Health Service. These were examined using correlational statistics, differences, distributions, non-linear relationships, and both Exploratory and Confirmatory Factor Analysis.

Findings suggested that personality may be a confounding variable in the measurement of the these constructs and that this may explain the relationship with psychological health. Sex differences were also found in the scores and were considered as a possible extraneous variable in interpretation of findings which are based on mixed sex data. The factor structure of each questionnaire was found to be inconsistent with those proposed by the original authors and it was recommended that the measures should not be used clinically in their present form.

Chapter 1 CONTENTS

CONTENTS

FIGURES **Page**

CHAPTER 1

1.1 INTRODUCTION

The current research aims to assess the clinical validity and utility of 2 measures, the Sense of Coherence Questionnaire (Antonovsky, 1987) and the Dispostional Resilience Scale (Bartone, Ursano, Wright & Ingraham, 1989) which are based upon the "salutogenic" or "health creating" (Antonovsky, 1987) approach to health care. The salutogenic model expands upon the current medical model by considering why people remain healthy as opposed to assessing why they become ill and may provide an alternative (Antonovsky, 1987) or complementary (Coe, Romeis, Tang & Wolinsky, 1990) approach to healthcare for the future. In order to move beyond theory and to inform good clinical practice this model must provide some reliable and valid form of measurement of why people remain healthy (Streiner & Norman, 1989). In this way a vital link is made between the theoretical and empirical aspects of the salutogenic model. In order to assess concurrent and discriminant validity the General Health Questionnaire and Eysenck Personality Inventory are included in the test battery. A brief background will be presented initially in order to outline the current approach to Western healthcare and why evaluation of the Sense of Coherence Questionnaire and the Dispostional Resilience Scale has clinical relevance. Reliability and validity of the measures and suitability of the measures included in the battery to assess validity will be discussed in the next chapter.

1.2 BACKGROUND

The medical model evolved in Western healthcare as the medical profession advanced its' knowledge of diseases and their management. In Britain early medical training occurred in teaching hospitals where medical students were taught to consider

symptoms and cures, however, teaching did not include the wider socio-economic issues beyond the hospital walls. This removed the potential to include health promotion within the medical model. Today awareness has expanded and provision for the wider community such as health projects and outreach programs (Rosenthal, 1993), health promotion oragnisations such as HEBS (Health Education Board for Scotland) and government policy (e.g. Designed to Care. See Scottish Office, 1998) display an awareness of health promotion. Despite increased awareness, however, the symptom based approach still predominates (Watt & Rodmell, 1993). One main aspect of this approach which might be improved is consideration of why people stay healthy as opposed to why they become sick and it is here that the Sense of Coherence Questionnaire and the Dispositional Resilience Scale may have clinical relevance. As the medical model is able to measure the presence and extent of health or illness through observation of symptoms any alternative would be required to have a model and measure of resilience. Both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale aim to measure peoples' perception of their ability to cope with their world, which is considered by the proponents of these models (Kobasa, 1979; Antonovsky, 1987), to be an index of both physical and psychological health.

1.3 MEDICAL MODEL

The fundamental assumptions of the medical model are that breakdown of homeostasis occurs when a system is disrupted or inadequate. This implies that illness occurs when the body or "system" is in difficulty and leads to the study of specific symptoms and syndromes (groups of symptoms used for classification of certain illnesses) and how to alleviate them. It is assumed that people themselves can do little to address any problems which occur and the emphasis is placed on assessing their needs and

difficulties as opposed to their strengths and ways of helping themselves. Although changing to a certain extent in more recent years through introduction of communication and negotiation skills training in medical schools, decision making is often handed over to the practitioner who is trained to deal with organic disease rather than to deal with health in the sense described by Antonovsky (1987) and who therefore conceptualises care in this way.

When the efficacy of the approach is assessed the dependent variable in any research remains the disease. From this perspective, it would appear that any advance in health must be seen to tackle disease as opposed to increasing the quality of life of a population for example who are not deemed "sick". As there is no place for consideration of what keeps people healthy, the potential for prophylactic care is removed. Not only is this loss of potentially useful information but there is a possibility of disempowerment of clients who must become "ill" before receiving advice or input from health professionals.

For the present time, the medical model still appears to predominate in the clinical setting. Among hands-on health care professionals, the role of the majority is to provide shorterm input to reduce symptoms as this is the most frequent outcome measure in evaluations (e.g. Pearson, 1987; McColl & Gulliford, 1993). The input itself is often in the form of medication as once again this appears to be most cost effective in the shorterm. In the same way the primary care psychologist is expected to provide shorterm psychological treatment to reduce symptomatology with the emphasis on time conscious therapy becoming increasingly evident in available literature (e.g. Jerald, 1997), conference topics (e.g. When there's not enough time, Padesky, 1998), in the new types of therapies emerging such as eye movement desensitisation and reprocessing (Van der Velden, 1996) and from the expectations of insurance companies in countries with a private healthcare system. The temptation for these professions in the current climate is to bypass prophylactic care as it is time consuming with little immediate evidence to feed back to managers and does not impact on waiting list problems.

This has brought the model under increased pressure to develop as it does not, in its present form, adequately contribute to health promotion (Luepker & Rastam, 1990). For those who support this model in its purest form declining mortality is viewed in terms of more effective cures being available as opposed to fewer people becoming sick and health increasing (Bone, Bebbington, Jagger, Morgan & Nicolaas, 1995; McKeown, 1979). Timing of treatment may therefore not occur at the optimum point where it is of most benefit to health, but instead may be applied only after clients become ill (Cochrane, 1972).

There is, however, no empirical evidence that an alternative model which includes prophylactic care, would be workable or acceptable to those in either the general population or the healthcare professions. Along with empowerment of clients to pinpoint and avoid future pitfalls, comes the responsibility which many people may prefer to leave with their medical practitioner.

James (1991) suggests that reform is more likely to occur if actual rather than conceptual shortcomings are highlighted. It might be argued that before clients and practitioners alike would be willing to embrace parallel development of another approach (e.g. the salutogenic model) the comparative viability of an alternative approach must be evaluated. In order to carry this out it is necessary first to identify a model which might offer a viable alternative and second, to find a way of assessing health using that framework.

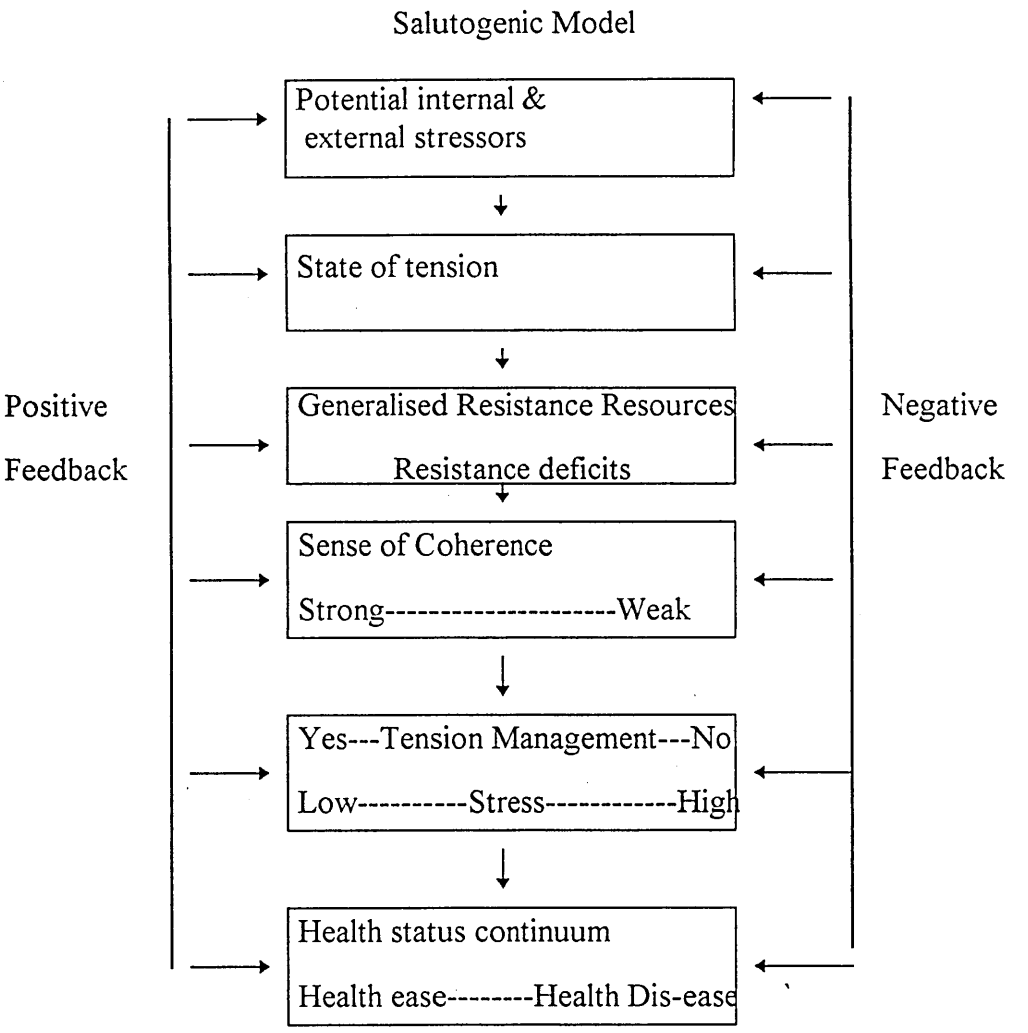
Two approaches which move beyond symptom management and according to their authors, provide a possible alternative to the medical model, are sense of coherence (Antonovsky, 1987) and hardiness (Kobasa, 1979). Both approaches have associated measures, which if demonstrated to be both valid and to reach stringent clinical standards, then offer an opportunity to assess the current and future resources of a population which contribute to their health. It would appear from certain health initiatives such as health promotion for the chronically ill (Bandura, 1991), that it is possible to improve health, as

separate from curing illness. On this basis it may be possible to use these alternative approaches alongside the existing medical model allowing health to be maximised at the same time as alleviating symptoms. In order to assess this, health in one population might be compared with another homogenous one in which the medical model alone is used in order to assess effectiveness.

1.4 SALUTOGENIC MODEL OF HEALTH

The salutogenic model is considered to be complementary to the medical model (Coe, et al., 1990) in that it provides a framework for consideration of how people maintain their health as opposed to how they become ill. It considers health on a continuum of health "ease" to "dis-ease". The healthcare approach is to encourage adaptive coping to move people along the continuum towards "ease". This is achieved as resistance resources are built up, which in turn leads to an increase in sense of coherence and feelings of self efficacy. This personal perception of coping is considered to affect health and personal growth (Antonovsky, 1987). This is described below in figure 1.1

Figure 1.1: Salutogenic Model of Health (Coe, et al., 1990, p 289)



The most notable difference between this approach and the pathogenic or medical model is that there is no cut-off point where treatment is applied. This avoids the dichotomous labeling system of "healthy" (not in need of health care) and "sick" (in need of health care) enabling prophylactic care to be considered. The recipients are empowered to be "clients" with choices to improve their health, as opposed to being "patients" disempowered through illness, and around whom decisions about their symptom management are made.

Antonovsky (1987) developed the Sense of Coherence Questionnaire (also known as the Orientation to Life Questionnaire) to test his theory that those who stay healthy may have some different characteristics to those who become ill.

The model upon which the Sense of Coherence Questionnaire is based is known as the "salutogenic" model. The Dispositional Resilience Scale fits well into this model and both measures will therefore be treated as salutogenic.

1.5 SENSE OF COHERENCE QUESTIONNAIRE

1.5.1 3 ELEMENTS OF SENSE OF COHERENCE

Antonovsky (1979, Ch 5, p123) defines sense of coherence as a disposition to see the world as manageable and predictable and comprises three elements. He proposes that sense of coherence consists of : **comprehensibility,** the extent to which a person's world makes cognitive sense, **manageability,** the primary resources which a person has at their own disposal or the secondary resources at the disposal of a family member, friend or colleague from whom they may glean help and finally, **meaningfulness,** the extent to

which a person sees their life as worthy of their investment of self and offering opportunity. This is the emotional counterpart of comprehensibility.

Notably these constructs are derived from interviews with subjects such as concentration camp survivors who have experienced severe life trauma. There is no empirical evidence provided for their existence.

Antonovsky (1987) considers that sense of coherence is the underlying element which general resistance resources have in common (Antonovsky, 1987, page 91). These resources he describes as

(1) consistency

(2) underload - overload balance

(3) participation in decision making.

These were inspired by Cassel's (1974) report of resources as predictable and offering feedback.

Examples of general resistance resources might include; a clear ego identity, social support, belonging to a stable society, clear religious beliefs. He considers these to have an additive effect thus the more resources available to a person the greater their chances of maintaining a healthy body and psyche. A strong sense of coherence which underlies these resources results in the ability to feel confident when facing the various stimuli which life presents.

1.6 DISPOSITIONAL RESILIENCE SCALE (MEASURE OF HARDINESS)

1.6.1 THREE ELEMENTS WHICH MAKE UP HARDINESS

The second salutogenic approach to health which will be considered in this research is that of hardiness. This was developed at the same time as sense of coherence

although without contact between the authors and concentrates on the similar characteristics of those people who appear to be healthier than their peers.

From her early psychology training involving existential philosophy, Kobasa (1979) identified possible contributory factors to the ability of certain people to thrive while others become ill. These she describes as hardiness, a personality style which consists of the following three elements which she argues can buffer against ill-health through aiding coping with stressful events.

Influenced by her training in the theory of existentialism and by empirical evidence such as Rodin and Langers' (1977) development of control among residents in nursing homes, she proposed elements of **control**. These are similar to the internal versus external locus of control proposed by Rotter (1966) and are defined as the belief that a stressful situation was within the person's ability to cope (as contrasted with powerlessness), (Kobasa, Maddi, Puccetti and Zola, 1985, page 525).

The second element she proposed was that of **commitment,** the ability to view a situation as meaningful, interesting and worthy of self investment (as contrasted with alienation), (Kobasa, Maddi, Puccetti and Zola, 1985, page 525). This dimension is supported by life span development research (Kimmel, 1990) which suggests the importance of continuity in both internal and external aspects of life. She argues that a consistent internal identity provides feelings of control, self efficacy, meaningfulness and predictability about life while the consistent external roles in relationships, the community and society relate to self esteem. As the person becomes less physically able for instance, they may retain an area of expertise and continue feel valued. This was later seen as the nearest to Antonovsky's sense of coherence (Kobasa in an interview with Wood, 1987).

Finally she proposed **challenge,** the ability to see change as normal, and presenting an opportunity as opposed to a threat, (Kobasa, Maddi, Puccetti and Zola, 1985, page 525). The ability to cope with uncertainty was central to this and found empirical support in the importance of cognitive flexibility in health (Wilson, Christensen, Merrifield &

Guilford, 1975). Once again this was linked to existentialism as Sartre, a philosopher of the existentialist movement, theorised about "being for itself" where a person constantly creates and seeks out the new and interesting simply for the joy of doing so (Sartre, 1947).

Possible roles which the preceding models may offer in addition to the medical model in health care today are outlined below.

1.7 WHAT HEALTH CREATING MODELS SUCH AS SENSE OF COHERENCE AND HARDINESS HAVE TO OFFER

When examining what sense of coherence and hardiness have to offer it can be seen from the many questionnaires on health and coping (e.g.Moos, 1990; Sanavio, 1988; EuroQuol 1990) that health care professionals are attracted by the possibility of predicting health status without the expense or invasion of genetic testing. Initial non-invasive testing techniques attempted to measure external stressors and to link these to physical and mental pathology (Dowrenwend & Dowrenwend, 1974; Pearlin, Menaghan, Leiberman & Mulan, 1981). This approach was reflected in the earlier health questionnaires such as Holmes and Rahe (1967). With later sophistication however it was noted that the relationship between life events i.e. external stimuli and health usually accounted for less than 10% of the variance (Taylor, 1986). The emphasis switched from purely external influences to include those resistance resources (e.g. sense of coherence and hardiness) within the person themselves or accessible through friends, relatives and colleagues (Antonovsky, 1987; Kobasa, 1979).

Both Antonovsky and Kobasa conceptualise the stressors which a person faces day to day, as ubiquitous and neutral until assessed. This approach adds the dimension of personal perception into the resistance resources and makes it impossible to assume that the same experience will have the same effect on each person. This expands on Coe et al.s'

model (1989) (see page 9) which alludes to perception in the first box "potential internal stressors" but does not specify how it may affect the feedback loop.

Removing all possible stressors or stimulation, which is the implication from the earlier Holmes and Rahe type research, therefore appears over simplified. This lack of stimulation in itself may be detrimental as it is clear from studies where subjects are deprived of sensory experiences (e.g.Grassian & Friedman, 1986; Woods & Britton, 1977) that this can lead to psychological pathology and in the most extreme cases even death. Thus it is not possible to remove stress by creating a sterile environment as this conceptualisation misses the positive aspects of stimulation which may encourage personal development. Once again this is a point of difference between the salutogenic and the medical model as the latter attempts to remove the cause and manifestation of illness through use of medication.

Research which followed Taylor (1986) became more centred on the internal world of the individual and how this contributed to health. McSherry and Holm (1994) for example found that those with low scores on the Sense of Coherence Questionnaire experience more psychological stress such as anxiety both before and after an expected stressful event. In contrast, those with higher scores displayed more approach coping, such as analysing the situation and preparing for it. This suggests that those who approach the situation have increased belief that they will cope and that those with lower scores did not recover as quickly after the experience. This is supported by research in problem solving which suggests that those who report approach behaviour, confidence, creativity (Cassidy & Long, 1996) and planning (Heppner & Krauskopf, 1987) tend to cope better than those who do not have these skills.

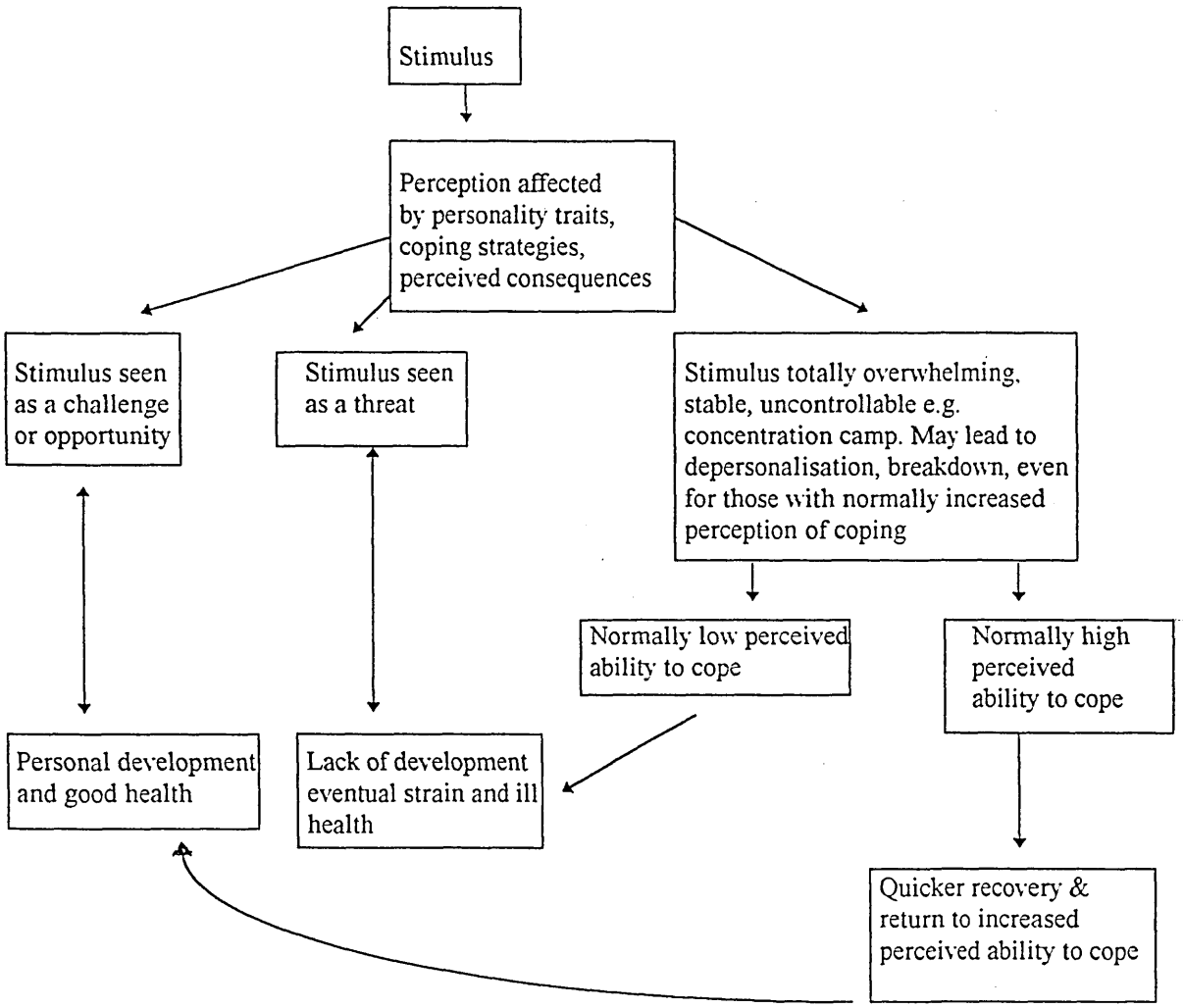
As those who are more anxious tend to have increased negative ruminations (Hallam, 1985), this may undermine their perception of coping and thus encourage avoidance and a lower sense of coherence. This may go some way to explaining the link between scores on the Sense of Coherence Questionnaire and Dispositional Resilience

scale and psychological well-being. The link with physical health may be explained by the research of Roger (1988) who found that those who ruminate about emotionally upsetting events will take longer to recover a normal heart rate and cortisol level. This elevated cortisol he describes as being linked with the development of various physical pathology. Thus it is possible that those who ruminate less and are less anxious may have increased perception of coping, increased general resistance resources and increased sense of coherence and hardiness.

The positive effects of increased personal resources and perception of ability to cope may, however, be overcome by external events in certain instances. An overwhelming event which is seen as stable, external and uncontrollable (Brewin, 1988) leads to feelings of low control in both the immediate situation and in any future situation with similar characteristics. Thus in certain circumstances the external environment can still be the main effect on health. Salter (1995) for example describes how sexual abuse may be an overwhelming event in relation to psychological health. A client who has experienced this trauma may develop negative affect, self critical cognitive style and relationship difficulties which become so well embedded due to the stable, external and uncontrollable aspects of the abuse that they believe themselves to be essentially "bad people". This type of external event can therefore have major longterm effects on psychological well-being.

One possibility of the interaction of personality, perception and external stimuli as conceived by the current author is outlined in figure 1.2 below.

Figure 1.2 MODEL OF THE EFFECTS OF PERSONAL PERCEPTION ON HEALTH



Relating this figure back to the findings of McSherry and Holm (1994) and Roger (1988) it can be seen how those with increased scores on either the Sense of Coherence Questionnaire , Dispositional Resilience Scale, or less emotionally focused rumination, might recover more quickly both psychologically and physically from a more major trauma and might be more likely to construe other stimuli as challenges with which they felt able to cope. For those with characteristics which lead them to find the environment threatening, i.e. more anxious and ruminative, when any stimulus is more likely to be seen as a problem than an opportunity to learn or develop, therapeutic input might be offered. Basing the assessment of need upon the measures under investigation it might be possible to offer assertiveness training for those with decreased perception of Control (hardiness dimension) and Manageability (sense of coherence dimension). Relating this to figure 1.2 input would occur in the perception box in order to add resilience resources into the cycle.

In the instance where the stimulus is considered to be universally overwhelming, uncontrollable and stable then it is possible that those with lower resources will be more likely to experience post traumatic stress disorder as they would be expected to have increased psychological problems (Antonovsky, 1987). This is supported by the International Classification of Disorders -10 (1992) which suggests that those with prior psychological problems will be likely to experience post traumatic stress. Through increasing the importance of a person's perception in their health resources, the possibility of input to improve their feelings of manageability is increased. If the external stressors are seen as the only causes of problems this may lead to increased feelings of helplessness and thus depression (Blackburn, 1992). This perception also supports the need for external rescue as opposed to emphasising internal ability.

1.8 POSSIBLE ROLES FOR SENSE OF COHERENCE AND HARDINESS ON A COMMUNITY BASIS

Sense of coherence and hardiness are not only relevant in one to one health care as revealed by consideration of the wider picture proposed by Morrill, Oetting and Hurst (1974)(see figure 1.3). The usefulness of the measures and their theoretical underpinning is considered here within the framework of clinical psychology and its aims in health enhancement. These aims are not limited to the micro environment (e.g. one to one therapy, group therapy, or treatment of symptoms in rehabilitation) but also cover the macro environment (e.g policy making, consultation).

Figure 1.3: Three Aspects of Clinical Psychology Intervention (Morrill, Oetting & Hurst, 1974)

In the following figure, Morrill, Oetting, and Hurst (1974) outline 3 aspects of clinical psychology intervention. Although this is only one profession it parallels healthcare in other areas in highlighting that individual intervention makes up only a fraction of the possible approaches to healthcare work. Any proposed alternative to the medical model would gain considerable strength from considering the wider picture. Ziglio (1991) for example comments that since the early 1970's the focus of health promotion has increasingly included the macro-environment of economics and policy making in which health may not be a specific goal but which may, all the same, have a major impact. An example of how the salutogenic model might address these areas is provided below.

Intervention Methods	Intervention Targets	Intervention Purposes
Consultation(e.g. legal, political)	Individual	Institutional changes
Media	Group	Scientific advances
Teaching	Organisational	Technological advances
Direct service	Community	Prevention
	Policy	Treatment

In the light of this conceptualisation of healthcare, sense of coherence and hardiness measures, which were able to validly assess personal resources which benefit health, would make a considerable contribution under each of the headings above.

For example individual measurement of a general practice population might reveal a group of people with lower than average sense of coherence and hardiness scores but with no physical or psychological health problems currently causing distress. In this way this group of people might become the **target for intervention** (see figure 1.3) to increase their health resources and thus reduce the chance of future pathology. There are already instances in health promotion of healthcare aimed at a group of symptomless individuals. For example the HEBS promotion currently seen on Scottish Television (1998). This aims to reduce heart disease by persuading outwardly healthy individuals to eat more vegetables and grilled food and was developed as a result of information on the typical diet in Scotland which was considered to be contributing to the high level of heart disease. Again in this instance the outcome measure may still be mortality as opposed to increased health however it is moving away from the purely medical approach and provides an example of how the salutogenic model might be applied in the community. The **purpose of intervention** (see figure 1.3), if based on the salutogenic model, might be considered as reflecting the aims of the World Health Organisation (1987) to increase health as opposed to reducing mortality. Alternatively it may attempt to change the institutional conceptualisation of health and illness. In the United States for example the insurance category for pregnancy and related treatment comes under "illness" while in the United Kingdom Oakely (1993, p119) describes the medical perception of childbirth as a "pathological process" in which "women are passive objects of clinical attention". These images she feels affect the experiences of the mothers in dealing with professionals whose expectations appear detached from the reality of the process. This mismatch will have implications for the type and availability of support, with possible knock-on effects for both physical and psychological health.

The **method of intervention** (see figure 1.3) might involve for example cognitive retraining (e.g. Padesky, 1994) in order to challenge people's underlying assumptions about lack of resilience and boost their self perceptions of control, meaningfulness etc. The questionnaires could thus be used to establish a baseline and assess the efficacy of the intervention in follow-up measures of the level of sense of coherence or hardiness after input.

Providing the scales are clinically useful and valid, the sense of coherence and hardiness models may offer a useful alternative or complement to the medical model when considering various levels of health management. The scales themselves offer the opportunity to assess and provide feedback to clients on their strengths and needs in relation to well-being.

For those whose assessment reveals many strengths this will be positive, however, for those with areas of need, it would appear necessary to offer some help on improving problem areas. Without this, the client would be left with the knowledge that there may be a problem but is again disempowered due to lack of guidance as to how this might be handled.

1.9 IS IT POSSIBLE TO PROVIDE INPUT TO IMPROVE SENSE OF COHERENCE AND HARDINESS ?

1.9.1 SENSE OF COHERENCE

A suggestion of how input might be provided to improve sense of coherence and hardiness was mentioned above in relation to assertiveness training, however, improvement of sense of coherence has not been widely explored in the literature. Gruman (1994) argues that one weakness of the theory of sense of coherence is the fact that it

describes desirable attributes without offering any way to achieve them. If this is indeed the case then completion of this measure may have significantly disempowering effect on those who find that they are nearer the "dis-ease" than "ease" end of the continuum.

An example of research which may give rise to Gruman's (1994) criticism is that of Ryland and Greenfeld (1991). In their study sense of coherence was found to be negatively correlated with perceived work stress and positively correlated with general well-being. They suggest some ways of encouraging the sense of coherence approach to life in the organisational setting by enhancing stress coping abilities. These include a supportive work environment with challenges which can be met, defined parameters and clear expectations, an appropriate workload, resources to complete the job and being able to trust supervisors are all considered important elements which contribute to a high sense of coherence.

This example of how sense of coherence might be improved has obvious parallels with good parenting (Bee, 1994), increased self efficacy (Bandura, 1977), internal locus of control (Rotter, 1966) and decreased helplessness (Peterson et al., 1993). In this way Gruman's (1994) criticism is therefore both refuted and upheld. Therapeutic input may occur to decrease feelings of helplessness and increase feelings of self efficacy but changes in the attitudes of superiors appears to be more of an external or at least organisational challenge than one which an individual might address.

It may be that Gruman was criticising Antonovsky's lack of contact with the individual. Antonovsky (1987) for example, criticises the absence of reference to a larger social system when considering the holistic approach to health and proposes that social stability and peace also play a part in the sense of coherence concurring with Morrill et al.s' (1974) model. This may indeed be a valid social comment however the average person does not have access to the political arena where changes of the above nature might be implemented. Emphasising Antonovsky's views further disempowers them by

heightening awareness about a helpless situation. This approach may, however, be useful if used to influence health policy but does give some validity to Gruman's comments.

Antonovsky (1987) also discusses the resources which he considers necessary to increase sense of coherence. Examples of these are, consistency, underload / overload balance and participation in decision making. These may not always be within the person's control or be offered by the wider social context. He also suggested that increased sense of coherence may be achieved through attempting to move from, for example, use of unconscious psychological defense mechanisms to the use of conscious coping mechanisms or from emotional suffering towards joy. This may be possible with intensive therapy, however, there is no evidence about the efficacy of such a process and no direction on how it might be carried out. In conclusion therefore there is no empirical evidence that sense of coherence can be improved and the theoretical arguments appear somewhat questionable and inconclusive.

1.9.2 HARDINESS

In contrast with the sense of coherence, Maddi (1987) moved nearer towards the proactive approach in hardiness through an experiment with United States managers. The concept of hardiness was broken down and taught as a cognitive-behavioural approach with the aim of modifying the persons approach to a stressor and encouraging a more hardy style. This involved:

(a) "Situational reconstruction" which emphasised problem solving and examining of underlying assumptions.

(b) "Focusing" which concentrated on bodily sensations in stressful situations to enable them to get a clearer view of their situation.

(c) "Compensatory self improvement" which was used should focusing fail to pinpoint a situation which was manageable. Instead the person might make some improvement and thus improve feelings of self worth.

As with cognitive therapy, the focus was on actively using the information to carry out a cognitive-behavioural experiment and solve a problem (Padesky, 1994), rather than simply remembering it as a technique to potentially use at a later date (Overholser, 1993). The facts are wrapped up as a means to an end and are more likely to be remembered. This provides a more structured approach which might be used in the therapeutic situation. This course was run by Maddi over 15 weeks and it was found at 6 months follow up to have maintained some of the increased coping mechanisms and consequent reduction in stress levels which it initially achieved.

Kobasa (in an interview with Wood,1987) reported teaching hardiness on an organisational level in hospitals. She aimed to increase understanding of the work process at each level, increase flow of communication in all directions and generally to implement a supportive approach within personnel management. It is not clear which techniques were used in this situation.

Kobasa's approach was to support new medics in the hospital, giving them information on expectations and process of their work environment along with ensuring that their concerns got back to their superiors. This was considered to increase perception of hardiness and consequently to reduce occupational stress and can be seen as similar to providing a supportive parenting role (Bee, 1994) as the younger employee develops.

Although once again the hardiness approach is more structured than that of sense of coherence, both approaches in the work setting appear similar in their aims to provide an environment which encourages development and maintenance of a personal belief that the person can cope, understands what is happening, feels supported and wishes to be involved and generally has increased feelings of control. Each of these aspects were encouraged in the hospital setting resulting in positive feedback from staff about

perception of a more nurturing work environment. This concurs with Antonovsky's belief that these personal resources must continue to be supported throughout the life-cycle and its various situations in order to thrive. Early parental support is not sufficient to maintain the person throughout their lives.

There therefore appears to be some empirical support for methods used to improve hardiness both individually and organisationally and that these effects persist at least at a 6 month follow-up.

As regards the development of these resilience resources, various factors may contribute to, or influence the individual differences found in both sense of coherence and hardiness. Arguably these are age and developmental influences, sex differences, environment and biology and are therefore seen as lifespan development issues.

1.10 DEVELOPMENT OF SENSE OF COHERENCE

Antonovsky (1987) suggests that sense of coherence is a trait which develops mainly up until early adulthood , around 30 years of age. Prior to this it may be considered to be more flexible or more easily affected by outside influence and therefore more state like. However, this argument is not covered in great detail by Antonovsky. There remains the possibility of change after adulthood is reached but it becomes less likely unless major life changes occur. Although not fully developed in childhood, the sense of coherence can still offer useful information which appears to be externally validated. Hyperactive children have, for example, been found to have significantly lower scores than normal controls when tested with a measure of sense of coherence adapted for younger subjects (Margalit, 1985). This may be seen as evidence which contradicts Antonovsky's claims if the sense of coherence is actually fully developed at this young age and the low scores already correlate with psychological disturbance. Alternatively those who develop a low

score in sense of coherence in adulthood may start at a lower level in childhood. As a modified scale was used in the Margalit (1985) study this may have influenced validity.

Social development in children may also be seen as a contributory factor to the development of sense of coherence through use of resources which are both personal and found among friends, relatives and acquaintances. This use of community resources and ability to cope socially is reflected in some of the Manageability questions in the Sense of Coherence Questionnaire (e.g.2,6,9). Hartup (1989) suggests that social and personality development is affected by relationships with parental figures (vertical relationships) and with peers (horizontal relationships). Through vertical relationships the child is able to develop belief in protection, security and to develop basic social skills. In horizontal relationships the child is able to learn social skills among equals such as co-operation, competition and intimacy.

The key life developments which Antonovsky (1985) outlines in achieving a strong sense of coherence and good mental health are listed below. Antonovsky (1987) believes that if supported by empirical data these developmental stages will offer a powerful tool to the therapist. Empirical data has not however been made available as yet and these stages remain theoretical.

Antonovsky (1985, page 274) Moving;

"(1) from use of unconscious psychological defense mechanisms toward the use of conscious coping mechanisms

(2) from rigidity of defensive structures to the capacity for constant and creative inner readjustment and growth (which once again links with adaptability and lower neuroticism, Costa & McCrae, 1987)

(3) from a waste of emotional energy towards its productive use

(4) from emotional suffering towards joy

(5)from narcissism towards giving of oneself

(6) from exploitation of others towards reciprocal interaction."

These have parallels with Neuroticism which is characterised by emotionality, avoidance, negative thinking and volatility of mood (Eysenck, 1965; Hallam, 1985). In line with the findings that sense of coherence is related to psychological health and coping (Antonovsky, 1993), neuroticism is also related to lack of adaptability and adjustment (Costa & McCrae,1987), emotionally focused coping, avoidance and psychological coping over time (Vollrath, Torgersen & Alnaes, 1995) suggesting that there may be a parallel between these constructs. The type of personality who is unable to retain control of their emotional responses with respect to the stimuli and events impinging upon them may also be dispositionally inclined to see the world as chaotic and difficult to manage, while the adaptable people, as mentioned earlier may be more able to problem solve and thus tend to feel more able to cope with life.

In the case of both sense of coherence and hardiness, the childhood / parent experience is seen as crucial in developing the various dimensions. Normal development of these stages is considered by Antonovsky (1987) to be related to psychological well-being. This is supported by the following studies which demonstrate the results of problems in the child / parent relationship. Conte, Plutchik, Picard and Buck (1996) found that for women paternal rejection and for men rejection by parents in general, was associated with self esteem in adulthood. Zemore and Rinholm (1989) report somewhat different findings that for women maternal behaviour which is intrusive and controlling, and for men paternal rejection, are associated with depression. As depression and self esteem are generally found to be related (Fennel, 1997) these findings are somewhat in contradiction with each other, although the main issues that difficulties within the child / parent relationship can be damaging in later life remains constant.

Antonovsky further reports that the development of sense of coherence is aided by an environment which embodies its principles i.e. which encourages development of the three dimensions. This is paralleled by Erikson's developmental stages (Erikson, 1950), the resolution of which are correlated with psychological adjustment, lower neuroticism

and lower trait anxiety (Lobel & Winch, 1987). Maintenance of a strong sense of coherence throughout the lifecycle (Antonovsky, 1985; Antonovsky & Sagy, 1986) is also influenced by the roles which the person comes to play in the family and in society, and by how much these roles meet the sense of coherence criterion. For example, the role as parent followed by grandparent in later life offers the opportunity for continuity in the role of carer. Meaningfulness is increased as the person finds their life to be purposeful and worthy of self investment.

A person's sense of coherence appears to have limits as it is effective only within their boundaries of personal concern which are defined by the areas of life within which they wish to take a role. These boundaries will vary for each person as the potential areas of involvement may extend to friends, relatives, jobs, world politics and further. The ability to recognise the limits of personal concern may be the result of a learning process over time. This has similarities to Gestalt therapy (Yontef & Simkin, 1989) which as part of its approach discusses the permeability of boundaries between self and the world. It is possible according to this theory that the person can give too much of themselves to the outside world or to other people or that they can receive and contain too much from the outside world. In both cases there is little space for their own needs reflecting a passive approach to life which often results in outbursts of aggression and low self esteem (Beel, Hopson & Scally, 1991). Alternatively they can have a rigid barrier which allows nothing in or out, resulting in isolation and lack of stimulation which, as mentioned earlier, can have extremely detrimental effects (e.g. Woods & Britton, 1977). This is a simplistic explanation of the process but highlights the need to have a flexible, semi-permeable boundary for good mental health. From the sense of coherence perspective this might be construed as considering the wider picture where necessary, which Antonovsky describes as being present in those with a strong sense of coherence and can be seen as a skill which might develop over time.

1.11 DEVELOPMENT OF HARDINESS

In no hardiness literature is a distinction made on the basis of age (e.g. Hull, Van Treuren & Virnelli, 1987; Maddi & Khoshaba, 1994). In Funk's (1992) comprehensive review of hardiness, the one mention of age was that students may have introduced a floor effect into the extent of health problems due to their age and relative lack of ill-health. This, it was considered, might bias the relationship of hardiness to health. Despite this hardiness appears to be implicitly considered to develop over time. For example, parenting or at least early supportive relationships are seen by Kobasa to provide the basis of early hardiness development and similar types of relationships can also improve hardiness in later life (Kobasa, 1979; Maddi & Kobasa, 1984). The type of parenting which provides an appropriate environment in which to build hardiness is characterised in the following way.

Commitment is said to develop through supportive interactions which involve encouragement and acceptance of needs and personal potentialities, while Control is built as the child is exposed to moderately difficult tasks which they can master and thus build belief in their own ability to influence their environment. Finally, Challenge is encouraged through the interpretation of change as offering potential benefits and interest as opposed to chaos.

It is logical that this last dimension of Challenge may develop last, as without the belief that they can cope, the child would appear less likely to engage in a changing environment. Bowlby (1988) for example discusses attachment to carers and describes how an infant will gradually become aware of itself as separate from the parent. With this new found role the infant can then begin to explore its environment and a positive relationship may be found between how confident the child feels about their carer and how far they will explore. This type of situation can be seen to embody development of Control and Challenge as it is an anxiety provoking experience, yet, as described by Hodiamont

(1991) anxiety is necessary to begin to individuate and to learn. The alternative to this is secure stasis which does not offer the opportunity to either learn from, or develop mastery of, the environment.

Moving into adult life, provision of encouraging, supportive interactions, for example in a work environment, can help develop and maintain hardiness. According to Maddi and Kobasa (1984), once developed it is considered that hardiness can modify stressful events both in the short and long term. The view which is taken of a situation, the active role which is taken in transforming it and the social support which is elicited all combine with general health practices such as lower drinking, smoking or healthier dietary habits.

Particular examples of this can be seen in various settings such as that mentioned in Bartone, Ursano, Wright and Ingraham (1989) in which high scores of hardiness combined with high social support in having a positive effect in modulating stress in army disaster helpers. Hardiness is considered to overlap with social support but to measure a distinct resource. McCranie, Lambert and Lambert (1987) found high hardiness moderated burnout in nurses over time by increasing perception of coping, suggesting that it may have some predictive validity. This may be because those who have higher hardiness scores are able to adapt to greater stressors as they are perceived differently or /and withdraw when the situation gets too stressful for their resources.

The applicability of the constructs in relation to elderly clients is somewhat questionable as there are no studies which address this area. It is possible that personal Commitment may increase with age. For example, Bengston, Rosenthal & Burton (1990) report that the basis for elderly relationships and marriages is familiarity and investment in the relationship. This has parallels with Antonovky's description of grandparents experiencing increased Meaningfulness as their role has continuity as a carer, however, it is not clear if this is as widespread in the West with different generations of families living further apart. According to the social psychology model Murphy (1989) also suggests that

the elderly in the West are socially and economically deprived. They commonly experience ill health, loss of status, income and a useful role in society all of which might contribute to psychological ill health and reduced hardiness. From this perspective it may be that sense of coherence and hardiness develop in a bell shaped curve with degeneration occurring in later years. This, however, remains in need of further investigation.

In conclusion therefore both sense of coherence and hardiness are considered to develop over time and to reach some level of stability in early adulthood. This development through adolescence fits with the expected identity crises of that stage of life (Erikson, 1969) when personality is not yet stabilised. An environment with the supportive encouragement of parental figures will tend to increase development of coping resources (Antonovsky & Sagy, 1986) while an environment lacking in these elements may cause delay.

Neither sense of coherence nor hardiness have stages of development which are attached to any particular age range and thus they do not necessarily coincide with standard theories of development. There is also no longitudinal empirical evidence to support developmental theories of either Antonovsky or Kobasa. Parallels can be drawn, however, with other developmental theories. Antonovky's (1985) use of creative inner flexibility to improve sense of coherence, would for example be achieved according to Piaget (1965) in the stage of "formal operations" (adolescence) in which thinking becomes freed from the environment and various possible future scenarios may be considered. This would fit with Antonovky's theory of development of sense of coherence prior to crystallisation in early adulthood.

As mentioned earlier, resolution of Erikson's developmental crises are found to be correlated with psychological adjustment, lower neuroticism and lower trait anxiety (Lobel & Winch, 1987). It is possible, therefore, that successful resolution of the crises at each stage may help to build strong resilience resources. Within the first four stages leading up

to early adulthood, the dimensions of sense of coherence and hardiness have a direct parallel with Erikson's (1950) stages of development.

Considering the second stage (autonomy in contrast to shame and doubt, early childhood), it can be seen how both Manageability (sense of coherence dimension) and Control (hardiness dimension), see pages 10-12 for details, might develop as a person began to build up their feelings of coping independently of their parents. Moving on to stage 3 (initiative in contrast to guilt, play age), the emphasis appears to shift to a sense of purpose which may reflect the early development of Meaningfulness (sense of coherence dimension) and Commitment (hardiness dimension). Also the ability to take initiative may be related to Challenge (hardiness dimension). In the fourth stage (industry in contrast to inferiority, school age) the development of competence further builds on the manageability and control. As this belief in competence develops through hard work, increased Comprehensibility (sense of coherence dimension) may begin to develop as might understanding about interactions with their environment. As these theoretical developments occur, the overall sense of coherence may begin to emerge as their identity forms in early adulthood. This is not however, supported with empirical evidence.

According to Erikson (1950, 1968) resolution of each stage resulted in increased self belief and strength of personality, and self belief at least is arguably part of the ability to avoid learned helplessness and depression (Peterson et al., 1993). Strength of personality is not adequately defined by Erikson in order to assess whether a parallel exists with hardiness and sense of coherence but it is generally associated with successful coping.

1.12 SEX DIFFERENCES IN RELATION TO SENSE OF COHERENCE AND HARDINESS

1.12.1 SEX DIFFERENCES IN SENSE OF COHERENCE

No mention is made of sex differences in scoring on the Sense of Coherence Questionnaire (Antonovsky,1987) and many studies have used subject groups in which no distinction is made between the sexes (e.g. Bowman, 1996; Hart, et al., 1991; Antonovsky, 1993). As their appear to be sex differences in perception of illness, with women reporting increased stress, unhappiness and perceived chances of illness (Verbrugge, 1989) in comparison with men, it would appear likely that sex differences might also be present in coping resources such as sense of coherence. Among those studies using the Sense of Coherence Questionnaire, where sex of subjects has been considered, there do not, however, appear to be sex differences in scoring.

In a longitudinal study carried out by Bernstein and Carmel (1991) both male and female medical students were found to have decreased sense of coherence scores as their course continued and became more stressful. The main sex difference found in this group was that males' trait anxiety increased more than females' over time, although notably the females had consistently higher anxiety scores throughout. Men reported more worries about academic pressures, such as hours of study and ability to pass exams, while the women were more affected by long hours of work, problems about getting a job in the future and the status of the medical profession in Israel. From these findings and in concurrence with (Verbrugge, 1989) it is possible to suggest that men may not perceive or admit to their anxiety levels to the same extent as women. It may be that they have a higher threshold for stress or that social pressure leads them not to complain until the severity makes it impossible to ignore. This might account for the sudden jump in reported trait anxiety scores as the threshold point is reached. In another study of longterm

marriages male and female sense of coherence scores did not differ significantly (Kaslow, Hansson & Lundblad, 1994).

Within adolescence, males were found to develop sense of coherence with age while females did not (Antonovsky & Sagy, 1986). This they suggest is due to males having a clear role identity and set of expectations in relation to their sex at that age, while females do not. Considering these findings along with the relationship between age and sense of coherence among only the female subjects in an adult study (Ryland & Greenfeld, 1991) it is possible that men and women develop their sense of coherence at different stages in life or that the role identity of women only becomes clearer, or stable enough to develop trait as opposed to state, sense of coherence at a later stage in life. Alternatively it might be argued that the increased emphasis of sense of coherence on community support (Antonovsky, 1987)may account for some of the differences in scoring between the male and female adolescents.

Females may not develop with age as their sense of coherence may be stable at this point. Bee (1994) suggests that women may achieve identity through intimacy. This may occur earlier due to their emphasis on relationships while male adolescents may still be developing these areas at this time. In relation to sense of coherence questions which ask, for example, about relying on others for help (Manageability, items 3,6,9), women may have a more stable response as they are more likely to have close friendships. Bee comments that among children friendships and supportive interactions are more likely to occur between females while males are more likely to stop interaction through disruptive behaviour such as disagreement, interruption or showing off. This link between sense of coherence and relationships does not, however, concur with the findings of Hart, Hittner & Paras (1991) who found that that those with high scores on sense of coherence do not perceive extremely high levels of social support. As this is based on a mixed sex sample it is possible that the relationship between female scores on sense of coherence and social

support is masked by a lack of this relationship in males whose high scores are accounted for by clear role identity as suggested by Antonovsky and Sagy (1986).

1.12.2 SEX DIFFERENCES IN HARDINESS

For similar reasons to those raised above in relation to sense of coherence it might be expected that this issue would be given some consideration in the hardiness literature but this is not the case. For instance Kobasa's research into hardiness has concentrated on male executives and managers as subjects (Kobasa & Puccetti, 1983; Kobasa, Maddi & Kahn, 1982; Kobasa, Maddi & Courington, 1981; Kobasa, Maddi & Zola, 1983) thus taking no account of possible sex or age differences in hardiness. With reference to the Dispositional Resilience Scale (Bartone et al., 1989) a population which did not specify sex differences was used for design purposes resulting in similar problems. Other research has either used only women (Ganellen & Blaney, 1984; Lawler & Schmied, 1992) or, more frequently, mixed sex groups of subjects but with no analysis made on the basis of gender (e.g. Hull, Van Trueren & Virnelli, 1987; Maddi & Khoshaba, 1994). In Funk's (1992) comprehensive review of hardiness the issue of gender differences is not raised.

1.13 GENDER RELATED SOCIALISATION

In considering hardiness and sense of coherence it is not possible to ignore the likely effects of gender related socialisation and how this may affect perceptions and responses to such self report measures. Feingold (1994) for instance, discusses three models of gender related socialisation which may be relevant; the social role model, the expectancy model and the artifact model.

In the social role model, the gender roles of the society affect behaviour. For instance in Western society it is most common for women to be carers. A question on a measure which asks about caring behaviour may therefore be answered differently by men

than women. This may also be answered differently at different life stages as Guttman (1975) describes that the sex roles of partners are polarised at the birth of the first child.

Similarly in the expectancy model it is proposed that the stereotypical beliefs of a society about the role of women lead these ideas to be internalised and acted out. It has already been mentioned how this has affected obstetric care Oakely (1993). The behaviour of one person to another is affected by their internalised beliefs about how each sex should act and what roles they should hold in society. In this way, the expected behaviours are modeled by others of the same sex and elicited through positive reinforcement of appropriate behaviour. These stereotypes are found in both adults and young children across many different cultures and not only in the West (Williams & Best, 1990).

According to the artifact model the importance which men and women attach to certain beliefs and behaviours affect their response patterns on measures covering these areas. Thus the social desirability bias may lead each sex to respond more strongly to characteristics on a measure which they believe to be important or admirable in their own sex. For example, men may believe that displaying emotions in public is not a positive masculine trait and therefore under-report this behaviour while women may believe that displaying maternal characteristics is a positive female trait and may therefore over-report their behaviour. Kohlberg (1966) suggested that once a child becomes aware of the permanence of their gender that they will attempt to conform to the requirements for membership of the group. It is possible that this same theme underlies to a certain extent, the social desirability theory in adulthood.

In considering specific aspects of behaviour it has been reported that there are no sex differences in self esteem (Hall, 1984) or assertiveness (Hall, 1984; Nolen-Hoeksema, 1990). This was challenged by later research, for example, Feingold's (1994) review of gender differences in personality found that males were more assertive and less anxious,

while females were more generally anxious but not in social situations. The gender differences appeared to be consistent across generations and nations. No differences were found in locus of control. Situation was considered to be a contributory factor, by Verbrugge (1989) who found that higher levels of female morbidity were explained by less involvement in paid work plus increased perceptions of stress, unhappiness and vulnerability to ill health. Such perceptions according to the model shown in figure 1.2 may directly affect sense of coherence and hardiness as these women feel less able to cope, less able to gain satisfaction and happiness from life and are more likely to view a stimulus as a threat than a challenge. This has direct parallels with the difficulties faced by the elderly (Murphy, 1989) which are felt to contribute to depression. The overwhelming influence of certain situations over the natural characteristics of the person can also be seen in this model and fits with Verbrugge's findings.

In conclusion, it would appear that the effects of sex differences on sense of coherence and hardiness require further examination in order to create norms for the measures if this is found to be necessary or to clarify that following investigation no sex differences are evident in scoring on these measures.

1.14 BIOLOGICAL CONTRIBUTORS TO SENSE OF COHERENCE AND HARDINESS

Although this was not specifically investigated in the current research, it is not possible to consider the behavioural and psychological elements of sense of coherence and hardiness without at least passing consideration of the biological influences. Since the early research of Seyle (1956;1974) which looked at the 3 stage model of alarm, resistance and exhaustion in relation to stress and coping both biological and psychological elements have been considered in parallel. Keller, Shifflett, Schleifer and Bartlett (1994) have taken this a step further and suggest that the three part model of stress (psychosocial), immunity (immunologic change) and health (disease outcome) underlies most psychoneuroimmunology. It is notable however that health and disease outcome which have been discussed as separate issues in this literature review so far are once again considered as synonymous in this instance.

If viewed within Keller et al.s' (1994) model the current research aims to address the psychosocial and health aspects. It may therefore be useful to consider the immunologic element here despite the fact that no biological measures will be taken in these studies.

Forbes and Roger (1999) have suggested that one of the most likely mechanisms to link cognitive appraisal of a situation with physical symptomatology is the hypothalamic-adrenal axis. This mechanism is largely regulated by the hypothalamic peptide corticotropin-releasing hormone (CRH) which stimulates secretion of adrenocorticotropic hormone (ACTH) in the pituitary gland. ACTH, in turn, stimulates cortisol secretion by the adrenal cortex. The loop is completed as cortisol then inhibits secretion of both hypothalamic CRH and pituitary ACTH. This axis has been found to play a major role in interaction with the immune system in periods of stress in both animals (Windle, Wood, Shanks, Lightman and Ingram, 1998) and humans (Goekoop, 1998).

Eysenck and Eysenck (1964) argue that neuroticism, which includes an element of anxiety, has a biological component. Characteristics such as sense of coherence and hardiness which covary with anxiety (e.g. Carmel & Bernstein, 1989) and physical symptoms (e.g. Carmel, Anson, Levenson, Bonneh & Maoz, 1991), may also be influenced by our genetic inheritance. Thus the hypothalamic adrenal axis may be linked with scores on these measures. For example it is reported that those who ruminate about emotionally upsetting events will take longer to recover a normal heart rate and cortisol level and thus be at increased chance of developing physical pathology (Roger,1988; Roger & Najarian,1998). Scores on the health questionnaires may therefore reflect perception of reduced resilience among those who have a tendency to ruminate. This may explain some of the covariance with physical health.

Hardiness is reported as interacting with stressful events to reduce illness (Kobassa, Maddi & Pucetti, 1982) and to be related to level of immune cells (Okun, Zantra, Robinson & Robinson, 1988). One explanation of this relationship between scores on the measures under investigation and health may be provided by Keicolt-Glaser, Malarkey, Cacioppo & Glaser (1994) who suggest that stress affects cardiovascular reactivity which in turn affects endocrine and immune function. These immune changes may predict future morbidity and mortality. Thus for those with decreased resilience scores who are less likely to believe that they have the necessary coping skills for any given situation a chain reaction of stress, increased cardiovascular reactivity, immune changes and consequent health problems may occur. There may also be a feedback loop further confirming their perception of inability to cope.

Similarly physiological links can be made with sense of coherence. For example Antonovsky (1987) describes sense of coherence as a much more community and socially based approach to coping than hardiness. Uchino, Cacioppo & Keicolt-Glaser (1996) report associations between social support and physical diseases such as coronary heart disease, cancer and other infectious diseases. An association is also reported between

sense of coherence and physical symptoms such as blood pressure (a cardiovascular measure) and seriousness of disease in terms of threat to life (Larsson & Setterlind, 1990). Uchino et al. (1996) suggest that this link between social relationships and health is also affected by the neuorendocrine system. When support is not present or a pathological relationship exists such as acting as a caregiver for a relative with Alzheimer's Disease, stress hormones may be released which alter the cardiovascular and immune systems. Thus provision of social relationships within the community which provide a buffering effect may increase perception of coping and reduce the negative cardiovascular and immune changes which may occur in less favourable environments.

A further biological explanation is made by Fisher (1984) who suggests that the presence beyond average requirements, of some biological components which increases anxiety such as adrenaline affect mood and performance. He comments, furthermore, that these biological states are not constant over time but are subject to hormonal cycles, circadian rhythms and limited availability of biological resources i.e. the body only has so much adrenaline to release at any given time. If it is the case that biology drives emotion and not the other way around this may affect perception and scoring on the questionnaires under investigation and may introduce the possibility of a state element being measured.

Both sense of coherence and hardiness are found to be related to psychological disorders (Frenz, Carey & Jorgensen, 1993; Ganellen & Blaney, 1984) which are once again linked to biological processes. Goekoop (1998) for example, reports a link with the hypothalamic adrenal axis as enhanced cortisol release is found to occur in the premorbid stages of both unipolar and bipolar disorders. Grahame-Smith and Aronson (1992) also propose that depression has a distinct neurological foundation. The monoamine theory is based on the findings that depletion of monoamine in the brain for example through use of reserpine (used to treat hypertension) brings on depression. Furthermore, reduction in serotonin and noradrenaline have also been related to depression.

Beyond the specific disorders, the general emotional state of a person is considered to be affected by the limbic system. This area is not well defined in neurology to date (Zuckermann, 1991) and is also hard to access making it difficult to test this hypothesis however if this is indeed the case then differences in this area of the brain may alter perceptions, health (Murray, 1995) and hence scores on the measures under investigation.

Other biological considerations when examining the validity and utility of the health measures are the lack of awareness of medication being taken by subjects which may artificially alter scores. For example, anxiety, panic, apprehension and other symptoms associated with increased neuroticism are neurologically affected and can be treated with psychotropic medication. Increased levels of beta-adrenergic autonomic discharge and adrenaline are considered to contribute to anxiety disorders which are commonly controlled by benzodiazepines (Grahame-Smith & Aronson, 1992). Without knowledge of subjects current drug treatment, the validity of the measures may be reduced by artificial improvement of scores due, for example, to a more positive perception resulting from the decreased anxiety.

These findings suggest that a biological predisposition to have health problems is a possibility, however, fundamental to the nature nurture debate it should be considered that there are 4 potential levels of interaction. These may result in similar scores on the sense of coherence and hardiness measures for different reasons and therefore imply the need for different approaches to clinical input.

On a basic level these differences might be explained as follows;

(1) Biological predisposition plus low nurture.

(2) No biological predisposition plus low nurture.

(3) Biological predisposition plus high nurture.

(4) No biological predisposition plus high nurture.

As has been discussed earlier in this section, a biological change may occur in both instances due to the involvement of biological mechanisms such as the hypothalamic-

adrenal axis. Those experiencing the various combinations of nature and nurture may report similar perceptions, personal resources, and psychological and physical health. However, this does not imply that similar types of input would be equally beneficial in each situation. For example, 2 clients may suffer from depressive symptomatology. In one case this may be due to early childhood sexual abuse and consequent low self efficacy and esteem in adulthood (Salter, 1995) while in the second case their may be some organic dysfunction. From a clinical perspective it might be necessary to concentrate on a psychotherapeutic approach for those with predominantly nurture problems in order to address the early nurture deficiencies while medication might be more appropriate for those with more specifically biological problems. This highlights the need to consider all contributory aspects when making a clinical formulation and that although potentially useful, scores on the sense of coherence and hardiness measures will provide only part of the picture.

1.15 SUMMARY

In the preceding section the areas of development which might be made beyond the medical model in current day healthcare were discussed. The main area of difficulty appears to be the inability of the model in its present form to consider prophylactic healthcare as opposed to purely symptom management, thus leaving clients disempowered. As there is no empirical evidence that any alternative model may be clinically useful or acceptable the need to assess an alternative approach in relation to the medical model was raised. Two models, sense of coherence and hardiness were proposed as offering the opportunity to consider healthcare in terms of maintaining health. As these models would be of little use in healthcare without some method of measurement, linking

the theoretical with the empirical and enabling theory to be tested, the need to assess reliability and validity of the associated measures was considered to be the first step. This allows the measures to be tested for reliability and validity in representing the underlying model. Aspects of human development, behaviour, biology, environment or experience which may contribute to sense of coherence and hardiness were discussed, however, the literature to date does not provide a detailed account of this. The question remains as to whether these measures might offer a clinician any new, reliable and valid information in addition to traditional measures such as, for example, the General Health Questionnaire or the Eysenck Personality Inventory which can be used to assess current psychological health or to predict those with increased likelihood of developing problems, respectively.

As a first step to investigating the clinical utility of the Sense of Coherence Questionnaire and the Dispositional Resilience Scale (which measures hardiness), the development of the measures, their reliability, validity, scoring and general standardisation will be examined in the next section.

Chapter 2 CONTENTS

CONTENTS

CHAPTER 2

2.1 RELIABILITY AND VALIDITY OF SENSE OF COHERENCE QUESTIONNAIRE AND THE DISPOSITIONAL RESILIENCE SCALE

Without reliable and valid measures to assess sense of coherence and hardiness in clients the models remain little more than interesting theory. In the work described here an attempt was made to investigate this issue, and in the first place the construction of the measures was examined.

2.2 SENSE OF COHERENCE QUESTIONNAIRE

2.2.1 CONSTRUCTION OF THE SENSE OF COHERENCE QUESTIONNAIRE

The Sense of Coherence Questionnaire was developed on the basis of data from a 1970 study of survivors of trauma, including concentration camp survivors, who remained healthy despite their experiences (Antonovsky 1987). This immediately raises questions about the applicability of this measure to other populations.

The Sense of Coherence Questionnaire is a 29 item self report measure assessing orientation to coping. Three dimensions are assessed, Manageability, Meaningfulness, and Comprehensibility. Agreement/disagreement is indicated in various forms on a 7 point Likert type scale. It is also available in a shortform as a 13-item measure (Antonovsky, 1987) made up of 4 meaningfulness items, 5

comprehensibility items and 4 manageability items, all taken from the longer 29-item measure. Five of the 13 items are reversed for scoring purposes and it is reported to correlate highly with the original 29 item measure.

2.2.2 CONSTRUCTION USING FACET THEORETICAL DESIGN

The measure was constructed using Guttman's Facet Theoretical Design and thus was not expected to factor into its components. The aim of Facet Theory as its name suggests is to construct theories upon which hypotheses or, in this instance a questionnaire, might be based. Domains to be included in the theory are identified and are constructed from the major concepts. Brown (1985) describes these groups of concepts as "facets" or conceptual categories which underlie a group of observations. The facets are then used to construct questions. In addition to measuring one of the three components of sense of coherence (Comprehensibility, Manageability, Meaningfulness) each of the questions also measures only one element of each of four facets which were created using Guttman's Facet Theoretical Design (Antonovsky 1987, p63 - 87). The facets in the current instance are modality, source, demand and time and these are reflected in the individual test items.

For instance one item reads;

(2) In the past when you had to do something which depended on co-operation with others did you have the feeling that it;

1	2	3	4	5	6	7
surely wouldn't get done						surely would get done

In this question the emphasis appears to be about the "source" of the persons coping resources as it centres on their perception that they can depend on others for help. This highlights Antonovsky's emphasis on social as opposed to purely individual coping.

The use of the word "feeling" also suggests the assessment of an affective component. Does the person feel able to depend on social support to increase their manageability ? In directing the person to a past experience where they feel either able or unable to depend on the co-operation of others, the episodic memory is tapped for a real life experience which is arguably more valid. This particular question is also part of the group of questions which represents the dimension of Manageability.

There is however criticism of the use of Guttman's Facet Theoretical Design. Korotkov (1993), for example, describes it as inappropriate for use in the design of a measure of personality resources such as those which make up sense of coherence. One criticism derives from the fact that the modality component of Guttman's Facet Theoretical Design requires the test constructor and subject to consider instrumental, cognitive and affective domains when in reality the area of personality which is being examined does not include a large affective component and may be contaminated by emotionality by taking this approach. The issue of emotionality and its influence on sense of coherence is followed up later in this chapter.

The role of the individual dimensions of Manageability, Meaningfulness, and Comprehensibility within sense of coherence is now discussed.

2.2.3 DIMENSIONS AND FACTORS OF SENSE OF COHERENCE QUESTIONNAIRE

An issue with both sense of coherence and hardiness is the definition of dimensions. These are the underlying elements of the questionnaires as conceptualised by the authors (e.g. through use of Guttman's Facet Theoretical Design) and are not to be confused with factors, the underlying constructs as defined through statistical analysis.

As mentioned earlier the development of the Sense of Coherence Questionnaire included 3 dimensions, which according Antonovsky (1987) are interdependent and inter-related and yet cover separate aspects of sense of coherence. This suggests a model of three inter-related dimensions which contribute to one main underlying construct. It was not intended that these be considered separately. It is therefore somewhat of a contradiction that the development and maintenance of the characteristics which make up each dimension is reported in the literature as if they are affected individually. For example Antonovsky (1985) discusses the role of his parents at a family gathering where their Meaningfulness is maintained by the important role of their memories of passed celebrations and the role which they have played in them throughout the years. Thus Meaningfulness is part of the sense of coherence concept but according to this example the dimension may also be influenced and can be seen as an entity in itself. It may be that Manageability and Comprehensibility are also influenced by this experience, however, this is not stated.

Despite the fact that Antonovsky has specified the lack of validity of using the dimensions of the questionnaire independently, it would appear that in its use in clinical

practice a reductionist approach has been taken with the measure. Petrie and Brook (1992) for example, considered the dimensions of Manageability, Meaningfulness and Comprehensibility as separate sub-scales in a study to predict future re-attempting of suicide. Their conclusions included the fact that of the sense of coherence dimensions, Meaningfulness alone provided the most useful negative, predictive indicator.

Further confusion is created by the fact that the dimensions of sense of coherence are discussed by Antonovsky as separate in their acquisition and effects, and that there is little evidence to confirm the construct as unitary with contributary dimensions (Antonovsky, 1993).

Antonovsky (1987) also proposes the sense of coherence as a potential therapeutic tool. As mentioned in chapter 1, if the therapist is only able to measure a person's place on the continuum of health ease to dis-ease without being able to offer a solution to any problem identified, this has limited clinical applicability. In the event that the therapist is able to educate the client about the separate aspects of the sense of coherence but unable to examine each one separately, this would go against the basic principles of the scientist practitioner (James, 1991) who would aim to evaluate the baseline and follow-up of the dimensions which are contributing to treatment.

2.2.4 SCORING

A total score consists of the rating on all 29 items and ranges from 29 - 207. Comprehensibility score ranged from 11 - 77, Manageability from 10 - 70, Meaningfulness from 7 - 56. Higher scores reflect a higher sense of coherence and thus increased coping.

The Sense of Coherence Questionnaire has a greater number of positively scored items than the measure used in the current research to assess hardiness (Dispositional Resilience Scale) which reduces the criticism (Fischman, 1987) that the presence of one personal resource is only inferred by the absence of another. For example absence of feelings of powerlessness may be seen as evidence of feelings of control within the Dispositional Resilience Scale. The reversal of scores does however present another problem of reduced standardisation through the increased potential for marking errors.

2.3 ORIGINAL HARDINESS MEASURE

2.3.1 SCORING AND CONSTRUCTION OF THE ORIGINAL HARDINESS MEASURE

Turning now to the construction of the hardiness measure it can be seen how this developed in parallel with sense of coherence.

Kobasa (1979) was also being influenced by the change in focus away from the medical model. Although totally independent of the sense of coherence the basis for hardiness fitted well with the salutogenic model. Initially Kobasa examined a group of male managers and like Antonovsky she noticed individuals who, despite stressful situations in their lives, did not succumb to illness or strain. She concluded that individual differences in stress responses were important. Once again, however, the specific nature of the group used to develop a measure may have caused a cohort effect.

The original hardiness measure was constructed by exploring previous work which might contribute to stress resistance and which also had empirical support. Questions were then gathered from existing questionnaires. This is an extremely popular method of questionnaire construction (Newell, 1993). In comparison with Guttman's Facet Theoretical Design it may be criticised for being less rigorous (Donald, 1995), however, as mentioned in the sense of coherence construction section, Guttman's Facet Theoretical Design is seen as inappropriate for design of a measure which assess personality resources (Korotkov, 1993).

Of the original 19 scales involved in the measurement of hardiness, 5 scales were maintained due to their reliability and validity. These were

(1) Alienation From Work Scale

(2) Alienation From Self Scale

(3) Powerlessness Scale (1 -3, all taken from the Alienation Test, Maddi, Hoover & Kobasa, 1982;)

(4) Security Scale of the California Life Goals Evaluation Schedule (Hahn, 1966)

(5) External Locus of Control Scale (Rotter, Seeman, Liverant, 1962). These are described in more detail in the following section.

Both the (1)Alienation From Work Scale and the (2) Alienation From Self Scale were used as negative indicators of Commitment (Maddi, et al., 1982; Kobasa, Maddi & Kahn, 1982). Concurrent and convergent validity for the Alienation From Work Scale was supported as high scores on this scale indicate lack of involvement in socially productive activity, detachment, apathy and meaninglessness. The assumption was therefore made that attributes at the opposite end of the spectrum of coping would be found among those with low scores, an issue which has subsequently been criticised

(e.g. Funk, 1992). Similarly the Alienation From Self Scale reflects lack of commitment to one's own beliefs and skills, and a passive attitude to decision making and goal setting which might be construed as avoidance. After testing across several adult samples the average internal consistency is reported as (Coefficient Alpha) .79 for the Alienation From Work Scale and .85 for the Alienation From Self Scale. Discriminant validity is considered to be demonstrated through the negative relationship of these scales with achievement motivation, purpose in life and role consistency (Maddi et al., 1982).

The (3) Security Scale of the California Life Goals Evaluation Schedule is used as a negative indicator of Challenge. It measures the extent to which safety, stability and predictability are important to the person. This is considered by Kobasa, et al., (1985) to provide convergent validity as those who score highly on this measure are unlikely to see change as a challenge but more likely as a threat. It has also been used widely in the normal adult population and Kobasa et al. report it to have established reliability although no specific figures are given.

The (4) External Locus of Control Scale and the (5) Powerlessness Scale of the Alienation Test are used as negative indicators of Control.

Kobasa et al., (1985) report that the External Locus of Control Scale has been shown to be a reliable and valid measure of control through external forces although no details are given. Convergent validation is provided in the literature through the correlation of external locus of control with anxiety and depression (Strickland, 1978) although depressed subjects were still found to experience guilt (i.e. internal locus of control) for causing their problems. This suggests the need to distinguish between favourable and detrimental outcomes when assessing control, an issue which is

highlighted only briefly in the hardiness literature in relation to dominance (see below). It has also been suggested that not all external influences are likely to create the same perception of lack of control. For example Levenson (1974) suggested that there should be 3 aspects of control considered; internal, external chance and external powerful others. He considered that being controlled by chance as opposed to by other people would not lead to the same perceptions of ability to cope.

Thus although the External Locus of Control Scale is reported as being valid and reliable there appear to be areas of the content domain which are not covered.

The Powerlessness Scale is reported as having an average internal consistency of (Coefficient Alpha) .88 over several adult studies (Maddi, et al, 1982) and reliability on test retest after 3 weeks of .71. They report further that convergent validation is provided through the correlation with trait anxiety, locus of control and conformism and discriminant validation is provided through the negative correlation with dominance thus giving some consideration to a negative and pathological aspect of control (Rosenman, Swan & Carmelli, 1988).

Maddi et al. (1982) reported these to be intercorrelated and to contribute to the single factor defined through principal components analysis. These scales were then combined to jointly define hardiness in the form of the Unabridged Hardiness Scale the first generation predecessor to that used in the current study.

2.4 LATER VERSIONS OF THE HARDINESS MEASURE

There have been 2 generations of hardiness measures since this point . The 20-item Abridged Hardiness Scale and 36-item Revised Hardiness Scale were both short

forms of the original Unabridged Hardiness Scale. It is frequently unclear which if any of these scales are being used to measure hardiness in published research thus making comparison and a clear definition of hardiness extremely difficult (Hull et al., 1987).

In the following section the Dispositional Resilience Scale, a third generation version of the original hardiness measure and that used in the current research, will be discussed.

2.5 DISPOSITIONAL RESILIENCE SCALE

2.5.1 CONSTRUCTION

The Dispositional Resilience Scale has the benefit of being a third generation development of the original hardiness measure and thus it might be assumed a more developed and refined instrument than the Sense of Coherence Questionnaire which is still in its initial form. It is made up of items from a larger pool which has been through increased psychometric analysis (Maddi, & Khoshaba, 1994) i.e. adjustments have been made to make the measure more reliable and valid.

During the evolution of the Hardiness questionnaires Funk (1992) who made an extensive study in this area, reported that the Dispositional Resilience Scale has improvements including more positively keyed items, an equal number of questions to measure each dimension and a more straight forward and accessible method of scoring than earlier versions.

Of the 45 questions 15 are positively keyed, internal consistency has been improved on the second generation measures, scores for the Challenge subscale no longer have to be doubled reducing error and raw scores are now used enabling comparisons across samples. There is another third generation scale, the Personal Views Survey (Kobasa, 1985). However it is copyrighted and, therefore, costly to use in extensive trials. The Dispositional Resilience Scale also covers similar items and content and has fewer negatively keyed items, a criticism of the early hardiness measures. It is more cost effective than previous versions as it is non-copyright and completion time is around 10 minutes.

Originally developed for use with blue collar workers (e.g.bus drivers and low level managers), the Dispositional Resilience Scale has been modified such that a number of problems found in the original version have been eradicated. For instance: long and awkward wording was altered, negative item indicators changed to create a mix of positive and negative, and questionnaire length was reduced from 76 to 45 items. The new version correlated - 0.93 with the older version (Bartone, et al., 1989). The magnitude of this correlation is explained by Bartone et al., as due to some overlapping items in the old and new form of the test, however the fact that the correlation is negative is not explained. It is possible that the negative indicators in the original test have not had their scores reversed before the correlation is made but this is not stated.

Kobasa et al. (1985) carried out a principal components analysis on the earlier version of the measure which reveals the three factors of Control, Commitment and Challenge in two studies (bus drivers, N=787, army officers N=111). The new version (Bartone et al 1989) has varying internal consistency for the subscales, (Cronbach's

alpha 0.62 - 0.82) and the overall measure is reported to reach an acceptable level (Cronbach's alpha 0.85). Bartone et al. (1989) note that discussion of the various factors which contribute to the measure should not imply that they should be considered individually as this might lead to an oversimplified view of what they describe as a "complex, non-reducible phenomenon" (page 320).

The division of the measure into its constituent dimensions as opposed to considering it as a total score is considered next.

2.5.2 DIMENSIONS AND FACTORS OF DISPOSITIONAL RESILIENCE SCALE

Early research on hardiness concentrated on the presence of one underlying construct which consisted of subscales, Control, Challenge and Commitment (Kobasa, Maddi, & Courington, 1981). The benefit of hardiness as opposed to other health measures was considered to be that the total score of hardiness i.e. the sum of the three subscales could more accurately predict psychological and physical health than each scale taken separately. As research continued however it became evident that these dimensions were related to distinct resources (Ganellan & Blaney, 1984; Hull, Van Treuren & Virnelli, 1987). This raised the issue of whether hardiness existed as a construct in its own right and if it did considering the construct as a whole entity would miss the detail of the individual dimensions. For example measuring only the total score might introduce the unreliable influence of the challenge dimension which was considered to be something of an unknown quantity (Hull, Van Treuren &

Virnelli, 1987). In short there are questions about the content validity of this questionnaire.

For instance, in some literature hardiness is considered useful when split into its dimensions. Kobasa (in an interview with Wood, 1987) goes so far as to discuss the varying profiles which are emerging of people high in one dimension while being low in the other. For example a person with high Control and low Commitment may be the type of person who is unsure of why they are heading in their current direction but knows that there is an urgency to get there fast. This may be indicative of the traditional Type A who burns themselves out (Rosenman et al., 1988).

Research to date has not produced consensus on the issue of whether hardiness is a unitary construct or a group of dimensions. Bartone et al. (1989) report that the dimensions covary to a certain extent while still factoring into three distinct question groupings. Furthermore they suggest that the total score should still be used in preference to the dimension scores. This raises the question of the existence of hardiness as a genuine construct. If in reality hardiness exists only as a group of scores which measure dimensions of Control, Commitment and Challenge, does it provide any innovation in relation to the original questionnaires from which these items were gleaned. Despite Bartone et al.s' (1989) suggestion that a reductionist approach should be avoided, there is no evidence so far in relation to the Dispositional Resilience Scale to support the claim that the combined score provides any information beyond that provided by the scores of the individual dimensions.

Reviewing the factors which emerge from hardiness does little to clarify the situation. A problem arises when comparing the conceptual dimensions and the actual factors which emerge as a result of statistical analysis. In the early studies Kobasa

(1979) found three factors which were considered to be the three dimensions. Problems with the content of the Challenge dimension were raised, highlighting a need for redefinition (Kobasa in an interview with Woods, 1987; Hull et al.,1987). Later studies (Funk & Houston, 1987; Hull et al.,1987) also found considerable overlap of the three dimensions. An attempt to iron out the difficulties with an earlier version of the hardiness measure was made by Pollock and Duffy (1990) who modified the questionnaire in line with the current criticisms. The improvements made included improved scoring, increase in the health specificity and measurement of the presence as opposed to the absence of dimensions. This modified version correlated 0.45 with the original. Results indicated two main factors. The first was made up of Challenge and Commitment items and the second of Control. The main differences in this questionnaire which may have affected the outcome of the principal components analysis were its correlations with perceived health status, engagement in health promotion activities and use of social resources. An oblique rotation was used in this analysis in line with the recommendations for interrelated items contributing to a single construct (Child, 1970; Harman, 1976). It might also be argued that these dimensions are not interrelated suggesting the need for a varimax rotation. This may also have affected the findings.

From these examples it would appear that the resulting factors are not consistent with the dimensions conceptualised as making up hardiness. It should be noted that this research did not use the Dispositional Resilience Scale but a modified version of a 2nd generation scale which is considered to correlate highly with the Dispositional Resilience Scale. The relevance of the findings to the measure used in

this study is therefore questionable. There are however no published factor analytic studies on the Dispositional Resilience Scale.

2.5.3 INTERACTION OF HARDINESS DIMENSIONS

Dimensions of hardiness appear, beyond the debate of unitary construct versus individual dimensions, to have interaction effects. The specific situation influences how the dimensions of hardiness interact at various levels to provide a personality resource. Kobasa in an interview with Woods (1987) discusses the differing profiles of various occupations. An executive for example may benefit from high Commitment or involvement whereas a doctor is taught that although there is a need to be committed there is also an important need not to get too involved in order to preserve their personal well-being. Thus generalising the benefits of a high score on each dimension may be inappropriate. If each dimension is associated with different coping resources then individual situations will alter the need for each resource suggesting that those people with the resources needed for one situation do not always have the resources to cope in other situations. This adds weight to the argument that hardiness is not a unitary construct and raises the question of whether it is useful in its current format.

2.5.4 SCORING

The Dispostional Resilience Scale is a self report, 45 item version (Bartone, Ursano,Wright, & Ingraham, 1989) of Kobasa's (1979) 76 item measure of hardiness. Agreement/disagreement is indicated on a 4 point, forced-choice, Likert type scale.

The total hardiness score consists of scores from all 45 items and ranges from 0 - 135. Each of the subscales of Control, Commitment and Challenge range from 0 - 45.

As in the case of the Sense of Coherence Questionnaire, the Dispositional Resilience Scale has the disadvantage of the reversal of scores. This increases both scoring time and potential for errors and reduces standardisation of the questionnaires.

The format of both the Dispositional Resilience Scale and the Sense of Coherence Questionnaires will be considered together in the next section.

2.6 PRESENTATION OF THE SENSE OF COHERENCE QUESTIONNAIRE AND THE DISPOSITIONAL RESILIENCE SCALE

Face validity of a measure is of prime importance due to the influence of this aspect of the design on a subject's willingness to complete the questionnaire (Anatasi, 1990). This is, however, difficult to assess as it is not a statistical but a subjective validity. The balance between brevity, reliability and validity should also be considered in order to make the most cost effective use of time. It is unclear from visual inspection which of the 2 questionnaires might be the quickest to fill out. The Sense of Coherence Questionnaire is presented on 4 sheets of paper and has only 29 questions, while the Dispositional Resilience Scale has 45 questions and is presented on only one sheet. The answer choices for the Sense of Coherence Questionnaire are different for each question while those of the Dispositional Resilience Scale remain the same throughout which also speeds up completion.

From purely visual inspection the Dispostional Resilience Scale appears to have increased reliability due to the increased length as a larger sample of behaviour is being

sampled (Anastasi, 1990). It also has the benefit of the same answer choices for each question, along with presentation on one sheet, thus reducing fatigue for the client.

2.7 VALIDITY OF THE SENSE OF COHERENCE QUESTIONNAIRE

2.7.1 CONVERGENT VALIDITY

According to current literature the Sense of Coherence Questionnaire is reliable and valid (Antonovsky 1993;). Support for convergent validity is provided as scores on the measure correlate for example with the following; hyperactivity in children (Margalit, 1985. A modified version of the Sense of Coherence Questionnaire was used for children); lower perceived work stress and increased general well-being (Ryland & Greenfeld, 1991); trait anxiety (Carmel & Bernstein, 1989); self esteem (Petrie & Azariah, 1990); global health evaluation (Dahlin, Cederblad, Antonovsky & Hagnell, 1990), trait anxiety, and depression (Frenz, Carey & Jorgensen, 1993), suicidal ideation (Petrie & Brook, 1992,) levels of distress, appraisal of and ability to cope with problems, (McSherry & Holm, 1994), perception of gains and losses in retirement transition (Antonovsky, Sagy, Adler & Visel, 1990) self esteem (Petrie & Azariah, 1990), physical and psychological well-being (Carmel, Anson, Levenson, Bonneh & Maoz, 1991, using the 13 item measure).

Closer examination of some of the research , however, revealed problems which cast doubt on apparent validity. In Sweden, for example, Dahlin, Cederblad, Antonovsky and Hagnell (1990) reported expected correlations between scores on the Sense of Coherence Questionnaire and both psychosomatic and emotional distress, (Symptom Checlist-90), material conditions, interpersonal relations, and inner feelings

on quality of life (Quality of Life Scale), and health based on interviews in which subjects reported ability to live, love, work and play well. The subjects were chosen on the basis of their status in childhood, i.e. of having at least 3 psychiatric risk factors such as parental alcohol abuse or parental psychological problems. Thus the subjects' childhood rather than their current socio-cultural or economic status was examined.This may have caused other current resistance resources to be overlooked, such as increased social support, career achievement or wealth. Of the original group, around 60% were interviewed at follow-up. Around half of them (30% of the original group) were found to have healthy successful lifestyles. These results were interpreted as suggesting that despite early childhood difficulties, those people with higher scores on the Sense of Coherence had achieved at least a moderately healthy existence. It appears that as regards the remainder of the original group who had died, emigrated or not replied, the assumption was made that they had lower scores on the Sense of Coherence Questionnaire when this had not been measured originally or at follow-up. It is also possible that among the group who did report a healthy lifestyle and high Sense of Coherence score that this developed after childhood as a result of other factors rather than being the cause for their success.

2.7.2 DISCRIMINANT VALIDITY

Information on discriminant validity is available although not to a large extent. Sense of coherence is found to be unrelated to socially based stress-resistance resources (Hart, Hittner & Paras, 1991) however this is using the 13-item, short form scale (Antonovsky, 1987).

There does not appear to be predictive validity available which suggests the need for a longitudinal study.

2.7.3 RELATIONSHIP TO PERSONALITY

The possible extraneous effect of emotionality or Neuroticism was raised by Korotkov (1993) as a threat to discriminant validity. As this relationship has so far been investigated with only the short form 13-item sense of coherence measure (Margalit & Eysenck, 1990) this is an area where further research using the 29 item measure is necessary. Findings so far have suggested a strong negative relationship between sense of coherence and neuroticism, however, use of the longer measure may reveal a different relationship to the short form version of the questionnaire reported above. Thus the question remains as to whether this measure offers any extra information over and above the personality inventories or is simply measuring neuroticism. As this personality trait has frequently been related to various aspects of health (Costa & McCrae, 1987) this contamination may account for, and thus cast doubt on, the various research mentioned above which are cited as support for the convergent validity of both the Sense of Coherence Questionnaire and the various hardiness measures. For example McSherry and Holm (1994) suggest as support for the validity and utility of the Sense of Coherence Questionnaire, the differences which they found among those with low, middle and high scores on the Sense of Coherence Questionnaire in levels of psychological distress, cognitive appraisal, coping processes

and pulse rate, all of which can be related to the biological and psychological characteristics of Neuroticism.

Antonovsky and Sagy (1986) discussed the direct negative relationship of sense of coherence with trait anxiety, a chronic disposition to react in an anxious fashion which is directly related to neuroticism.

It was found that sense of coherence is only sometimes related to state anxiety (Antonovsky & Sagy,1986), an anxiety reaction which is short term and related to a specific situation. The research findings suggested that in a situation which involves acute threat and which is perceived as such by the whole community, sense of coherence is not related to state anxiety. Even those with higher scores on sense of coherence will experience state anxiety in these threatening situations. It is possible, as suggested in figure 1.2, that the relationship between state anxiety and sense of coherence may return once the communally threatening situation is passed, as those with a higher sense of coherence may once more feel able to cope and therefore less anxious. Those with lower sense of coherence scores may also show a relationship with state anxiety in a situation which is not universally threatening due to their increased negative affect and consequently negative appraisal of the situation.

It would appear from these findings that the impact of personality characteristics is less important than that of the situational factors once the situation is perceived by the majority to be threatening. Although it is unclear which explanation holds most weight, it appears that those with a high sense of coherence either recover more quickly after experiencing threat or they have a higher threshold for their subjective perception of threat. At a point where those with a weaker sense of

coherence feel threatened, those with a higher sense of coherence would feel able to cope and report lower state anxiety.

It might also be expected that those with increased sense of coherence or hardiness might recover more quickly after stress, reflecting the relationship of state anxiety to sense of coherence mentioned above. Those with increased resources may feel more able to cope as they see the situation as temporary or feel distressed only at a higher level of stimulation. The suggestion is supported by evidence from Martin (1985) who found that Neuroticism was linked to both the risk of becoming clinically depressed and the time taken to recover from it. He suggests that those with high Neuroticism may have taken longer to recover due to the vicious circle of negative cognitive processing and depression reinforcing each other. In the initial development of sense of coherence, however, the subjects had been in a situation of communal threat in the concentration camps. This suggests that situational factors would have overcome a high sense of coherence. Alternatively the length of exposure to stress may have caused the reaction to be chronic i.e. the person had reached physical and mental burnout, and therefore the influence of personality characteristics no longer outweighed the situational influences or provided increased resilience for rapid recovery afterwards. In either instance the questions raised about the questionnaire, by use of such a specialised group of subjects cannot be ignored.

2.7.4 COHORT EFFECTS

Another issue to consider in the standardisation of the measure is the possibility of cohort effects. Although now more widely used (20 countries reported

in Antonovsky, 1993), the Sense of Coherence Questionnaire was initially based on Israelis, many of whom were concentration camp survivors. This has implications in terms of cohort effects perhaps due to age, race or experience. The Sense of Coherence Questionnaire has not been altered since initial development therefore any initial problems have not been addressed.

2.7.5 STATE OR TRAIT

If the effects of hardiness and sense of coherence disappear in certain situations then the question remains as to whether they can truly be considered as traits. Examining a parallel situation may clarify this. For instance an extroverted person who is continually ignored in a certain situation will, according to social learning theory (Bandura, 1977), eventually give up attempting to communicate despite their natural character. It does not seem likely that giving up the attempt to understand and control a situation which has no basis in logic and cannot be controlled (e.g. a trauma of some kind) means that the characteristic has disappeared. It might, therefore, be argued that sense of coherence and hardiness are indeed traits, particularly given the timescale over which it has been suggested they develop.

2.7.6 SOCIO-CULTURAL ISSUES

Antonovsky intended that the Sense of Coherence Questionnaire should be a gender and socio-cultural free measure (Antonovsky, 1993). That it may be free of

socio-cultural bias does indeed appear to receive some support. For example, Bowman's (1996) study of Native American's suggests that major differences in family size, conditions and culture does not reduce the relationship of sense of coherence to both physical and mental distress. Antonovsky (1993) also reports relationships between sense of coherence and both physical and mental distress across 20 different countries around the world but makes no reference to socio-cultural differences in this review.

2.7.7 GENDER

There is also evidence that there are no gender differences in scores on the |Sense of Coherence Questionnaire in adolescents (Margalit & Eysenck, 1990) and interestingly that the female group still exhibit increased scores on neuroticism, casting some doubt on the suggestion that neuroticism may be a contaminating element in sense of coherence. There is, however, contradictory evidence which reports that in a group of adolescents, males have higher scores on the Sense of Coherence Questionnaire than females and also develop stronger scores over time (Antonovsky & Sagy, 1984).

This also raises the issue of age in relation to the measure. Antonovsky (1987) describes sense of coherence as developing over childhood and becoming more trait like in early adulthood. The study by Antonovsky and Sagy (1984) mentioned above is one of the few studies to consider the effects of age which suggests that further research is needed on this subject.

2.8 VALIDITY OF HARDINESS MEASURES

As with the Sense of Coherence Questionnaire, initial inspection of the hardiness measures suggests high validity. For example, hardiness has been found to be related to reduced emotionally focused coping (Gentry & Kobasa, 1984); lower lymphocyte counts and delayed conversion from HIV positive to AIDS (Solomon, Temoshock, O'Leary & Zich, 1987); reduced digestive problems and increased contentment in shiftworkers (Wedderburn, 1994), increased self reported health status (Campbell, Amerikaner, Swank & Vincent, 1989) and level of immune cells (Okun, Zantra, Robinson & Robinson, 1988). It has also been found to interact with stressful events to reduce illness (Kobasa, Maddi, & Puccetti, 1982). Commitment, one of the dimensions of hardiness is related to depression (Ganellen, & Blaney, 1984). This appears impressive until further investigation reveals the variety of hardiness measures used in these studies.

The plethora of hardiness measures which have been used to measure this construct is a confounding variable in any attempt to assess reliability and validity. It is frequently unclear from the published information which version of the questionnaire has been used. The most commonly referenced scales are as follows; Unabridged Hardiness Scale (Kobasa, Maddi & Kahn, 1982) and the 2 second generation, shortened versions of this, the Abridged Hardiness Scale, Revised Hardiness Scale, the third generation measures Personal Views Survey (Maddi, 1987) and the Dispositional Resilience Scale (Bartone, Ursano, Wright & Ingraham, 1989), which has been less frequently used. Among these only the 2 second generation measures are not highly correlated with each other (Funk, 1992) however other measures have also been

designed and it is not always clear how these relate to the original measures. This situation makes comparison of research findings at best, less reliable and at worst, impossible.

2.9 VALIDITY OF THE DISPOSITIONAL RESILIENCE SCALE

2.9.1 VALIDITY

Separating out the research which refers to only the Dispositional Resilience Scale, there is little support for validity although it is based on the earlier hardiness measures described above which do demonstrate validity. The Dispositional Resilience Scale demonstrate convergent validity through an expected relationship with health status in army disaster helpers, (Bartone, et al., 1989). While this finding adds to claims about earlier hardiness relationships with health and suggest the possible utility of this third generation measure, it also serves to higlight the problem of a lack of research on validity using this measure.

2.9.2 COHORT EFFECTS

Again, however, methodological problems cast doubt on these findings. The Dispositional Resilience Scale was tested on blue collar workers in America (Funk 1992; Bartone et al., 1989) introducing the potential for effects due to personality type or other cohort effects. This would reduce the utility of the questionnaire across wider populations. In addition, possible race and gender differences remain uninvestigated.

2.9.3 RELATIONSHIP OF HARDINESS TO PERSONALITY

Funk (1992) suggests that hardiness may inadvertently measure neuroticism and thereby raises the question of whether this measure would offer any information to the clinician which was not available through existing personality measures. This has not been addressed in relation to the Dispositional Resilience Scale in the literature to date but is an important issues when considering clinical utility and validity of the scale.

2.9.4 HARDINESS STATE OR TRAIT

Rhodewalt and Agustsdottir (1984) found that hardy individuals who perceived an event as stressful or beyond their control did show psychological distress. Hardy people, it might be assumed, may be less likely to perceive a stimulus as a problem but may still in certain extreme circumstances be overwhelmed suggesting that hardiness is more similar to a trait than a state measure.

No hardiness studies consider the effects of age on hardiness making it impossible to comment on the longitudinal nature of this resource.

2.10 SIMILARITIES BETWEEN THE SENSE OF COHERENCE QUESTIONNAIRE AND THE DISPOSITIONAL RESILIENCE SCALE

It is claimed that hardiness and sense of coherence measure similar constructs (Antonovsky, 1987; Williams, 1990) and that the 3 dimensions in one questionnaire parallel those in the other. The aims of the models to provide a measure of personal resources which might be used in prophylactic care, screening or health education both at the micro and macro level are also similar. How far the similarities go, and whether the questionnaires actually measure unique characteristics remains an issue for debate which will be addressed in the current research.

2.11 THEORETICAL DIFFERENCES BETWEEN SENSE OF COHERENCE AND HARDINESS

Theoretical differences exist between Antonovsky (1987) and Kobasa (in an interview with Wood, 1987) in the role of challenge in building stress resistance Kobasa proposes that, in order to stretch themselves individuals should seek out challenges which are slightly beyond their present abilities while Antonovsky and Sagy (1986) consider that exposure to unnecessary challenges may endanger well-being. It therefore appears that Antonovsky is not encouraging development of the sense of coherence in the same way that an individual might be given encouragement to push themselves in line with the "no pain no gain" philosophy of Western culture.

The issue of personal ability to cope appears to be a distinctive element when comparing sense of coherence and hardiness. Antonovsky believes that hardiness takes

the approach of Western society to Manageability (compare to Control in hardiness) in keeping the resources on an individual level. The sense of coherence in contrast includes the resources to which a person has access through significant others. Although it seems valid that the input of others may affect well-being it does not appear to come within the remit of a person's individual approach to life. Should the person who helps manage their affairs be removed then their "personal" manageability might decrease significantly. Alternatively the person in question may have a personal style which includes always finding someone else to manage for them.

Control finds its origins in Rotter's (1966) Locus of Control which Antonovsky also criticises for its failure to include access to resources of significant others.

2.11 SUMMARY

It appears from the preceding section that many aspects of the validity and clinical utility of both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale, remain in debate. These questions outlined in the following chapter will make up the body of the current research.

In the next section a pilot is described in which the aim was to assess the research design and the health creating models of Antonovsky (1987) and Kobasa (1979).

Chapter 3

CONTENTS

CONTENTS

CONTENTS

TABLES AND FIGURES **Page**

CHAPTER 3

3.1 PILOT STUDY

3.1.1 INTRODUCTION

In order to reduce the chance of serious design problems arising later in the research a pilot study was carried out. The aim was to assess the feasibility of the overall research design, appropriateness of tools etc. using a small initial sample which was representative of the subjects most likely to be used in the following research. This was an initial step towards testing the hypotheses generated from a review of current literature on both the Sense of Coherence Questionnaire, Dispositional Resilience Scale, and their relationship with personality. A brief discussion of the main issues of the research and the consequent hypotheses are covered in the following section.

The literature review described in chapters 1 and 2 suggested the possibility that the total scores and sub-scale scores on the Sense of Coherence Questionnaire and Dispositional Resilience Scale may be measuring similar constructs. This inter-relationship between the measures has not been empirically tested.

With reference to the internal structure and design of the scales, it was noted that the earlier hardiness measures upon which the Dispositional Resilience Scale was based had been factor analysed during construction but that there were no analyses of the current version. The validity of the current factors, and in particular Challenge (Hull, Van Trueren & Virnelli, 1987), is dubious in that both the structure of the

measure and validation of existing factors remains an area of debate. Similarly although Antonovsky (1993) does report on several unpublished, and therefore non peer reviewed studies, which include factor analysis of the Sense of Coherence Questionnaire, there is only one published factor analyses of the measure (Flannery & Flannery,1990). This study appears to use an orthogonal rotation of the varimax type which does not allow correlation between the factors. In the light of the theory that sense of coherence is a unitary factor (Antonovsky, 1987) an oblimax rotation which does enable factors to correlate with each other may have been a more suitable choice (Child, 1970).

The use of factor analysis is of course a contentious issue in itself and this is discussed later in greater detail. However it is suggested that if interpreted with care it can be of considerable use in making informed judgements about sub-scores and in investigating the validity of questionnaires (Rust & Golombok, 1989). Eysenck and Eysenck (1964) suggest that factor analysis is necessary but not sufficient to clarify underlying elements in test construction which examine aspects of personality. If as proposed, sense of coherence and hardiness are related to elements of personality it would suggest that they would be most effectively assessed using the same method. In research described here the relationship of sense of coherence to hardiness is assessed along with their relationship to psychological well-being and personality.

Neuroticism is reported to be related to health through its effects on the autonomic system, where extensive arousal has been linked to mental and physical pathology (Carlson, 1994). It has been associated with a lack of coping, specifically problem focused coping and emotional discharge when faced with a difficult situation (Vollrath, Torgersen & Alnaes, 1995), avoidance (Holahan & Moos, 1987), low self

esteem and depression (Teasdale & Dent, 1987). Sense of coherence and hardiness are considered to be personality characteristics related to both mental and physical pathology (Antonovsky, 1987; Kobasa in an interview with Wood, 1987). It is possible that neuroticism is a large part of what sense of coherence and hardiness measure and it should therefore be compared and contrasted to these constructs in order to assess whether they are distinct entities.

Turning now to another issue, there is considerable evidence both theoretical and empirical, to suggest that humans change and develop over time (Piaget, 1965; Erikson, 1969; Kimmel, 1990). Antonovsky (1987) reports students, a younger group of the population, to have slightly lower scores on the Sense of Coherence Questionnaire and that scores are considered to increase with age, crystallising in early adulthood. This suggests a maturational component in the construct. Sex differences also exist, for example Antonovsky and Sagy (1986) report that females develop their Sense of Coherence at a slower rate than males, however, this is in contradiction to Antonovsky's aims (1993) to create a gender and socio-cultural free measure. In reality however health may be affected by gender, socio-cultural or age factors making it impossible to design a measure which is unaffected by these elements. Neither Antonovsky (1987) or Bartone, Ursano, Wright and Ingraham (1989) report separate female and male norms, and sex and age differences do not appear to be addressed in any depth in the hardiness or sense of coherence literature despite findings such as Feingold's (1994) that gender differences do exist in personality. It would appear that the lack of consideration that these issues are generally given in interpreting results on the health questionnaires might lead to invalid results.

The hypotheses which result from the issues discussed above are as follows and will be investigated over the course of the following studies;

3.2 HYPOTHESES

(1) Sense of Coherence Questionnaire and Dispositional Resilience Scale total and sub-scale scores are positively correlated.

(2) Sense of Coherence is a single factor construct.

(3) Hardiness is made up of three separate factors which contribute to an overall score.

(4) Both Sense of Coherence and Hardiness are related to Neuroticism

(5) As high scores on the Sense of Coherence Questionnaire and the Dispositional Resilience Scale reflect well-being, both the Sense of Coherence and Hardiness should be negatively related to scores on the General Health Questionnaire, which are higher for those with psychological difficulties.

(6) Age differences are evident in personal coping resources.

(7) Sex differences are evident in personal coping resources.

3.3 METHOD

Forty women and 20 men, aged between 18 and 65 years, mean age of 26 years, were recruited from a first year Behavioural Science class at the University of Abertay Dundee, Scotland. Participation was voluntary. On the day of testing any students who did not wish to be tested did not attend class.

In order to test the external criterion related validity of the sense of coherence and hardiness scores these will be matched with the scores from a commonly used clinical measure of psychological well-being, the General Health Questionnaire. Discriminant validity will be tested using a measure of personality, the Eysenck Personality Inventory. As psychometrics is part of the curriculum for Behavioural Science students it was not considered valid to include results from the Lie scale of the Eysenck Personality Inventory which assesses social desirability due to their previous knowledge of the measure.

3.4 MATERIALS

The battery of questionnaires included, Sense of Coherence, 29-item version (Antonovsky, 1987), Dispositional Resilience Scale (Bartone et al., 1989), Eysenck Personality Inventory (Eysenck & Eysenck, 1964), General Health Questionnaire, 12-item version (Goldberg & Williams, 1988. See appendices II- V for questionnaires and scoring instructions.

Fatigue effect was considered in the choice of the questionnaires which made up the battery. Both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale take around 10 minutes to complete. The Dispositional Resilience Scale is a shorter measure of hardiness than earlier versions, while still considered to retain reliability and validity. In the current study it is presented on a single page while the Sense of Coherence Questionnaire is somewhat longer in appearance and is presented on 3 pages, although consisting of only 29 questions.

3.5 DETAILS OF QUESTIONNAIRES

(1) Sense Of Coherence Questionnaire (Antonovsky, 1987). Scores ranged from 29 - 203 (See appendix II).

(2) Dispositional Resilience Scale (Bartone et al., 1989). Scores range from 0 - 135 (See appendix IV).

(3) Eysenck Personality Inventory (See appendix V) is a development of the Maudsley Personality Inventory (Eysenck, 1959; Knapp 1962) and consists of 57 questions covering two dimensions of personality; Extroversion / Introversion with scores ranging from 0 - 24, Neuroticism with scores ranging from 0 - 24, plus a Lie scale which is designed to pick out subjects who appear to be showing a "desirability response" score, although as mentioned this will not be used in the current research. Scores on this scale ranged from 0 - 9. This single page questionnaire is widely used in clinical settings and is considered as a valid measure of personality. Previous problems with this measure included correlation between the dimensions but this has now been eliminated. It should also be noted that scores on both Extroversion and Neuroticism tend to reduce with age (Eysenck & Eysenck, 1964). This questionnaire takes around ten minutes to complete and was included to assess the relationship of personality traits to health measures.

(4) General Health Questionnaire, 12-item version (See appendix III) is the briefest version of the original Goldberg (1972) 60 item questionnaire. Again this single page questionnaire was used to reduce the size of the battery and the extraneous effects of physical symptomatology which are reported in the longer versions. Scores range from 0 - 12. It reveals levels of psychological distress or alternatively

may be used to predict the likelihood of the person being found to reach "case" level of psychiatric illness. It does not contain any items which are liable to distress the respondent as reported by Goldberg (1972) after extensive field trials, and takes 1 or 2 minutes to complete.

It is suggested by the authors that scores over 8 indicate "caseness" with allowance for personal clinical judgement to achieve a higher "positive" rate. At any time it is predicted that 12 - 20 % of the population will demonstrate "caseness". This study used the 0-0-1-1 method of scoring, i.e. answers score either 0, if responses are negative or 1, if responses confirm the presence of a psychological indicator.

3.6 DESIGN

A within subjects design was used with all subjects completing the Sense of Coherence Questionnaire, Dispositional Resilience Scale, General Health Questionnaire, 12-item version, and the Eysenck Personality Inventory on one occasion. Data collected is ordinal as it is measured on a continuous numerical scale with "not at all" to "completely true" on the Dispositional Resilience Scale and a seven point scale with two extremes such as "never" to "always". The data were therefore treated as ordinal and the appropriate statistical tests were applied and these are detailed in the results section.

3.7 PROCEDURE

The study tested a single group of students, both male and female. The general nature of the study was described with minimal detail to reduce any bias which might have resulted and subjects were given the option of opting out during the completion. Subjects were asked to be as spontaneous as possible and not to confer. More detailed feedback was given at the end of the session about the long-term aims of the study. It was suggested that anyone who had found that the questionnaires raised issues which they would like to discuss further should approach their student counsellor. An hour was allocated for completion although all were finished well within the allotted time. Verbal reports after the completion of the questionnaires suggested that that the presentation of the Dispositional Resilience Scale on one sheet of paper reduced fatigue as it was obvious to the subject that there were no further elements to the questionnaire.

All directions on procedure and scoring of the specific questionnaires can be found in appendices II - V.

3.8 RESULTS

Due to an experimenter oversight only the ages and sex of the group are known and not the ages and sex of each individual.

3.8.1 CORRELATIONS BETWEEN SENSE OF COHERENCE SCALE AND DISPOSITIONAL RESILIENCE SCALE

As the data were in rank order and ordinal, Kendall's Correlations were used to assess the association between scores on the Sense of Coherence Questionnaire and the Dispositional Resilience Scale.

That Sense of Coherence consists of only one factor remains a purely theoretical claim apart from the questionable results of Flannery and Flannery (1990) which, as mentioned earlier, uses an orthogonal rotation of the varimax type. This does not allow correlation between the factors, which, in the light of the theory that sense of coherence is a unitary factor (Antonovsky, 1987) would seem a less appropriate choice than an oblimax rotation which does enable factors to correlate with each other (Child, 1970).

Antonovsky (1993) also reports on further factor analytical studies, however, these are unpublished and have therefore not received any peer review. The dimensions were therefore considered as sub-scores but total scores were also analysed. Antonovsky (1987) draws parallels between the dimensions of the Sense of Coherence and those of the Hardiness questionnaires. The parallel constructs are listed below.

Table 3.1: Dimensions of Sense of Coherence and Hardiness Which Are Considered To Be Parallel In Content

Sense of Coherence	Hardiness
Comprehensibility	Commitment
Manageability	Control
Meaningfulness	Challenge

For clarity the correlations with the Eysenck Personality Inventory and General Health Questionnaire are presented here.

Table 2 contains details of the results which show a significant relationship between both Sense of Coherence Questionnaire total and dimension scores, and either total or dimension scores from the Dispositional Resilience Scale. Scatterplots were also carried out in order to assess whether any non-linear relationships were present, however, only the relationship between Neuroticism and scores on the General Health Questionnaire merited further mention. This is reported in Figure 3.1 on page 96.

Table 3.2: Kendall's Correlation of Sense of Coherence Total Score and Separate Dimensions with Hardiness Total Score and Dimensions, General Health Questionnaire and Personality

	SOC	MAN	MEA	COM	H	CO	CM	CH	N	E
MAN	.61 ***									
MEA	.61 ***	.37 ***								
COM	.53 ***	.36 ***	.28 ***							
H	.42 ***	.43 ***	.34 ***							
CO	.35 ***	.33 ***			.6 ***					
CM	.5 ***	.4 ***	.43 ***	.35 ***	.64 ***	.46 ***				
CH					.42 ***					
N	-.45 *** 2-tail	-.38 *** 2-tail	-.32 *** 2-tail	-.34 *** 2-tail						
E					.31 *** 2-tail					
GHQ	-.36 ***		-.37 ***		-.31 ***				.38 ***	

Note: 40 men and 20 women were used for all the statistics above, except those involving Comprehensibility where the scores for 1 woman were missing.
SOC = Sense of Coherence total score, MAN = Manageability, MEA = Meaningfulness, COM = Comprehensibility, H = Dispositional Resilience Scale total hardiness score, CO = Control, CM = Commitment, CH = Challenge, N = Neuroticism, E = Extroversion and GHQ = General Health Questionnaire.
*** = $p < .001$. All non significant results are reported in appendix VI.

Without a Bonferroni correction the chance of finding one or more significant tests by chance alone is 92.31%. The alpha level of each test has therefore been lowered to $p<.001$ in order to bring the alpha level overall back to $p<.05$.

It can be seen from table 2 that the sense of coherence total score is highly significantly correlated with each dimension of hardiness except Challenge. The hardiness total score is also highly correlated with both Manageability and

Meaningfulness dimensions of sense of coherence. All the dimensions in both scales, except Challenge, are also significantly correlated with each other.

The correlations between General Health Questionnaire and both hardiness and sense of coherence are not as clear-cut. It is significantly correlated with the total scores of both measures, and only with the dimensions of Meaningfulness in sense of coherence.

Finally considering the correlations of personality with each of the sense of coherence and hardiness. Neuroticism is significantly correlated with sense of coherence total score and all dimensions but unexpectedly not with hardiness total score or dimensions. It should be noted however that without Bonferroni correction both hardiness total score and Commitment were correlated with Neuroticism at the 99% significance level (see appendix VI-12) which may warrant further investigation in future studies with a larger number of subjects.

Extroversion is not significantly correlated with sense of coherence total scores or any dimensions, however, it is significantly correlated with hardiness total score and all dimensions except Challenge.

3.9 DISCUSSION

3.9.1 INTERRELATION OF SENSE OF COHERENCE QUESTIONNAIRE AND THE DISPOSITIONAL RESILIENCE SCALE

As predicted the scores on the Sense of Coherence Questionnaire and the Dispositional Resilience Scale are positively correlated, however this is not a perfect correlation suggesting that each may have its own area of utility which the other does not cover.

The results in table 2 indicate that a correlation does exist between the Sense of Coherence Questionnaire total score and several aspects of the hardiness measure. Notably there is a strongly positive correlation between the total scores of the two questionnaires which supports current research. Antonovsky (1987, page 48) suggested that Meaningfulness paralleled Commitment (hardiness dimension), Comprehensibility paralleled Challenge (hardiness dimension) and Manageability paralleled Control (hardiness dimension). As all of the Sense of Coherence dimensions have the largest correlations with Commitment, while only Manageability is correlated with Control and there are no significant correlations between sense of coherence and Challenge, this is not supported. The lack of a correlation with Challenge further supports findings that this dimension is something of an unquantified element which may not add much to the Hardiness construct (Kobasa in an interview with Wood, 1987; Hull, Van Treuren & Virnelli, 1987). It is possible that it provides a unique element in these questionnaires however it has not so far been linked with any positive health outcomes. Examining the correlations of Hardiness with the General Health

Questionnaire and Extroversion, it appears that Challenge does not correlate with any element in the battery.

Hardiness has a similar profile to that of Sense of Coherence in relation to the General Health Questionnaire suggesting possible similarities in what is assessed by each measure but is unique in being correlated with Extroversion. This may be due to the positive effects of Extroversion (Gray,1970) being inadvertently measured as part of hardiness. These positive aspects are that those who are extroverted are more likely to approach a situation in the hope of gaining positive feedback, than those who are introverted who tend to avoid any situation where there is a chance of negative feedback thus reducing their interactions and also their chances of positive feedback. Barnett and Gotlib (1988) reported that Introversion and lack of social integration were also core characteristics of those suffering from depression, suggesting that Extroversion, at the other end of the continuum, may have a buffering effect. In the light of Funk's (1992) review the relationship of hardiness with neuroticism was unexpectedly non significant. As it reaches 99% certainty level before Bonferonni correction is applied this may require further exploration with a larger sample of subjects.

As men are considered to have slightly higher extroversion scores than women (Eysenck & Eysenck,1964) it is possible that the Dispositional Resilience Scale is measuring more male than female personality characteristics. The Dispositional Resilience Scale may tap into an element of personality such as being able to seek help when necessary which is more typical of someone who is more extroverted. Question 19 is an example of this;

(19) If I am working on a difficult task I know when to seek help.

This is supported by Anson, Caramel, Levenson, Bonneh and Maoz (1993) who report on several studies which link locus of control, an element of hardiness, with the ability to make use of other resources such as help from others when necessary. Vollrath et al. (1995) also report a relationship between Extroversion and problem focused coping.

Alternatively those with increased scores on extroversion may have a less sensitive perspective on life and therefore not perceive stimuli as outwith their control and therefore as threatening to them. As the questions on the Sense of Coherence Questionnaire do not concentrate as much on personal control but tend to consider community support, while the Dispositional Resilience Scale questions concentrate more on personal ability to cope, this suggests that different aspects of coping may be being assessed by each measure. This may, therefore, account for the correlational difference which Sense of Coherence and Hardiness have with Extroversion.
This can be seen in the following questions which are taken from the parallel dimensions of each questionnaire.

Sense of Coherence Questions- Manageability Dimension

(2) In the past, when you had to do something which depended upon co-operation with others did you have the feeling that it:

1	2	3	4	5	6	7
Surely wouldn't get done						Surely would get done

(6) Has it happened that people whom you counted on disappointed you:

1	2	3	4	5	6	7
Never happened						Always happened

Dispositional Resilience Scale - Control Dimension

(4) No matter how hard I try, my efforts usually accomplish nothing.

(11) It is usually impossible for me to change things at work.

3.9.2 CONCURRENT VALDITY

The negative relationship of scores on the General Health Questionnaire which distinguishes levels of psychological distress and need for psychological input (Goldberg & Williams, 1988), with scores on both the Sense of Coherence and Hardiness measures supports the hypothesis that they co-occur with mental pathology. This offers some external validation of the health questionnaires from a widely used, valid and reliable questionnaire. Those with low Hardiness and Sense of Coherence in the current study, can therefore be considered to have poorer general mental health.

3.9.3 CONSTRUCT VALDITY

Intercorrelation of the dimensions on the Sense of Coherence Questionnaire is seen to be high confirming the presence of one main factor however the intercorrelation is not high enough to confirm that only one factor exists.

Intercorrelations of the hardiness dimensions suggest that, based on these data, Challenge does not contribute to the total hardiness construct, casting doubt on its existence as described by Bartone et al. (1989).

3.9.4 DISCRIMINANT VALIDITY

The negative relationship of scores on the Sense of Coherence Questionnaire with Neuroticism supports Funk (1992) who suggested that health questionnaires inadvertently measure neuroticism and then reverse the score to highlight the presence of some other aspect of behaviour. This raises questions about the discriminant validity of the measure. The lack of a significant relationship between Neuroticism and hardiness is, however, unexpected in the light of Funk's (1992) review which found neuroticism to be a confounding element in both old and new measures of hardiness. This he suggests occurs through the presence of many negatively scored items in a measure such as the Dispositional Resilience Scale which infer the presence of one characteristic through the absence of another. For example, a question on alienation may be considered to tap into the persons feeling of involvement or "commitment" by reversing the obtained score (Question 7 on the Dispositional Resilience Scale " Working hard doesn't matter, since only the bosses profit by it.", reverse score item).

In an earlier paper Funk and Houston (1987) also highlight potential areas of overlap between Neuroticism and the Dispositional Resilience Scale. They point out that hardiness scales resemble maladjustment scales such as the Eysenck Personality Inventory used in this study. For example;

Dispositional Resilience Scale - Daydreams are more exciting than reality (Commitment)

Eysenck Personality Inventory - Do you daydream a lot ?

Dispositional Resilience Scale - If someone gets angry at me it is usually no fault of mine (Control)

Eysenck Personality Inventory - Are you easily hurt when people find fault with your work ?

In the examples above hardiness appears to tap into aspects of depression such as avoidance and hostility which are features of neuroticism. It might therefore be expected that hardiness may in consequence be measuring neurotic type features as a predictor of present and future well-being as opposed to tapping into a unique concept of hardiness. This more especially as no measure was specifically designed on the basis of the hardiness model but instead pre-existing measures were brought together to represent it, leading to questions of validity in what is being measured.

As the Sense of Coherence Questionnaire has a majority of positively scored items, this would suggest that it will be less likely to be affected than the Dispositional Resilience Scale, however, this is not supported by the current findings. Examination of the results suggest that Sense of Coherence is more strongly correlated with Neuroticism than Hardiness. The Sense of Coherence Questionnaire includes 13 reverse keyed items out of 29 in comparison with the Dispositional Resilience Scale's 30 from 45 items. Although the erroneous variable of reversed scoring has been reduced the highly negative relationship with neuroticism remains (Sense of Coherence total score correlated with Neuroticism, Tau = - .45, $p < .0009$).

It is not, however, totally unexpected that Sense of Coherence might show some correlation with neuroticism, as Eysenck (1987) claims neuroticism to be linked to biological processes i.e. inherited lability of the autonomic system while Antonovsky (1987) claims Sense of Coherence to be related to both mental and physical pathology. The autonomic system is involved in fight or flight responses through the sympathetic activation. This enables the organism to expend energy and parasympathetic responses which compensate for the sympathetic responses by returning the body to normal functioning. A continual or frequently repeated state of arousal which might occur due to the presence of the trait neuroticism, would lead to exhaustion or dis-ease as the body is unable to maintain this position long-term. This is supported by research discussed earlier in the initial literature review, such as Roger and Najarian (1998) and Roger (1988) who suggest that those who ruminate about emotionally upsetting events will be at increased risk of developing physical problems due to an elevated cortisol level and increased length of time to recover normal heart rate. Thus, a clear link can be made between neuroticism and pathology, which in turn is found to be related to Sense of Coherence.

Further links can be made which may explain the relationship of this measure with Neuroticism. The autonomic nervous system is considered to be involved in the inborn aspects of emotion as described in the James-Lange Theory (Hicks, Okonek, & Davis, 1980). Another theory of emotion (Schachter & Singer, 1962) takes this a step further and considers both the physiological and cognitive attribution of the cause of arousal, as leading to the emotional state. Thus, according to Schachter and Singer, it would appear that neuroticism which leads to a highly emotional state, must also consist of both the physiological predisposition, plus the cognitive attribution. It is

suggested by Forbes and Roger (1999) that the hypothalamic- ardrenal axis may account for this link. These findings suggest the possibility that cognitive attribution may account for some of the variance in the dimensions of the health questionnaires.

It would appear that this is a more complete explanation of why a subject might have a low score on the Sense of Coherence Questionnaire or Dispositional Resilience Scale as it is never possible to separate totally the cognitive from the biological. Indeed, it may be argued that biological traits will always predate cognitive traits as they can occur in the womb.

This raises certain questions about neuroticism. If neuroticism is to an extent inherited then this may account for the biological element in the theory. It is possible that resources which at least covary with neuroticism if not overlap (i.e. sense of coherence), are fluid until early adulthood as a result of developing cognitive processes at different ages. Although it cannot be assumed that the relationship between neuroticism and cognitive strategies is two way, this possibility raises the issue that teaching certain cognitive processes such as metacognitive techniques could change the perceived level of neuroticism, and, peoples' reported ability to cope with these feelings. This in turn might lead to consequent positive effects on day to day life. Thus scores on the Sense of Coherence Questionnaire might also be increased. This may suggest that in a similar way to neuroticism , an element of sense of coherence is inherited while the rest is learned, thus sense of coherence may largely overlap with neuroticism or one may be a partial by-product of the other.

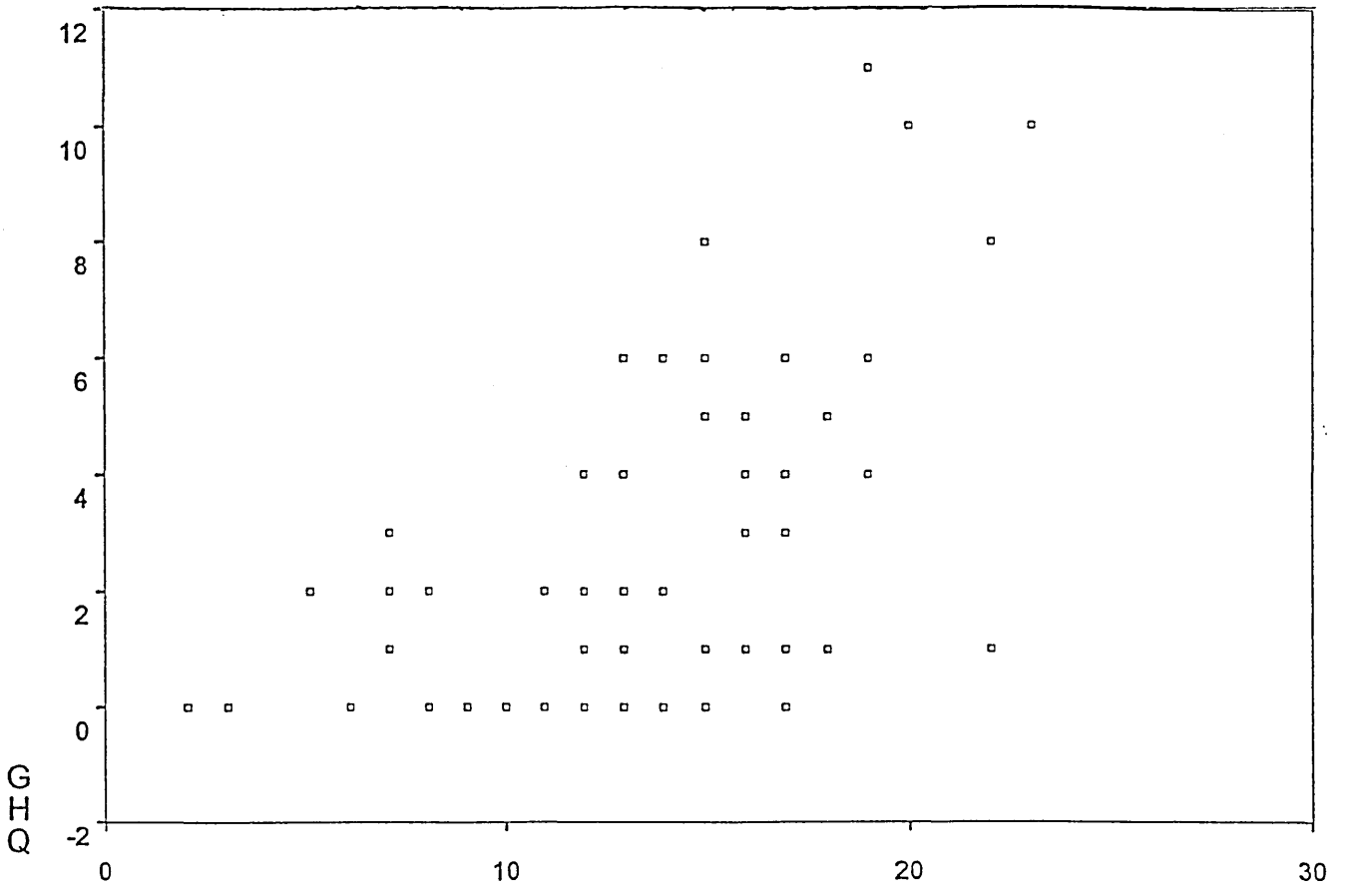
As further evidence for the at least partially biological basis for neuroticism and extroversion Eysenck (1963, 1981) reports that a person's position on the introversion -extroversion continuum can be altered through use of drugs which affect the central

nervous system. It must therefore be considered that consumption of drugs which affected the autonomic system such as anxiolytics and anti-depressants might affect scores on the Sense of Coherence Questionnaire. If indeed scores were affected this might reduce the usefulness of the measure among the public or within the work place unless a person's current medication was also known and this may involve issues of personal privacy. Clinical use within for example a General Practice setting, for instance, would also need to take the extraneous effects of drugs on results into consideration.

A review of the literature did not reveal any links between Sense of Coherence and neuroticism using the 29-item measure, suggesting an area where the current research might make an advance. Neuroticism is linked with anxiety, depression and low self esteem (Roth, 1984; Teasdale & Dent, 1987) supporting the relationship with mental pathology, Allred and Smith (1989) found that those with a high neuroticism score tend to exaggerate somatic complaints although they notably still showed similar patterns of physical health to others with lower scores suggesting an element of hypochondriasis.

As suggested earlier, neuroticism appears to be made up of biological and cognitive elements and may be affected by drug intake. With the inter relation of both Neuroticism and scores on the General Health Questionnaire and Sense of Coherence, the correlation of Neuroticism with scores on the General Health Questionnaire is not unexpected. As this relationship does not appear to be a standard linear relationship it is examined in the following scatterplot.

Figure 3.1: Scatterplot of General Health Questionnaire in Contrast With Neuroticism



Note: GHQ = General Health Questionnaire, Neuro = Neuroticism

This scatterplot was found to have a significantly linear relationship ($F = 23.53$, $df = 58$, $p < .0009$).

Although significantly linear the scatterplot of Neuroticism and scores on the General Health Questionnaire reveals a number of subjects with both medium to high Neuroticism while still reporting good psychological health. This suggests that Neuroticism alone may not be adequate in distinguishing between those with or without the need for psychological input. Rim (1987) for example reports a positive relationship between problem focused coping and neuroticism in men and a negative relationship between problem focused coping and neuroticism in women. As scores on the health questionnaires (i.e Sense of Coherence Questionnaire and Dispositional Resilience Scale) were related to scores on the General Health Questionnaire it is again suggested that Sense of Coherence and Hardiness both measure something other than Neuroticism or Extroversion which is related to psychological distress.

The current findings suggest that scores on Sense of Coherence Questionnaire are negatively related to Neuroticism, scores on the Dispositional Resilience Scale are related to Extroversion, while and scores on both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale are negatively related to the General Health Questionnaire. The combined elements of Neuroticism, Extroversion and scores on the General Health Questionnaire do not explain the total variance in these measures which suggests that the Sense of Coherence Questionnaire and Dispositional Resilience Scale may indeed offer a unique aspect to health prediction by measuring additional factors.

Having completed the pilot study, the choice of questionnaires, process of data collection, feedback and provision of advice to seek help from a counsellor should the questions raise any issues for the subjects, were considered to be adequate and will be

used in all future studies. As the collection procedure was to be anonymous and non-invasive, presentation to the ethics committee was not required.

Due to an experimenter error which resulted in the age and sex of individuals being unavailable, it was decided that a checklist of materials would be compiled for the following studies in order to stop this error being repeated. The range of age and sex were, however, available from a class register.

3.10 SUBJECTS

Use of students as subjects, especially those with some knowledge of questionnaires must be seen as potentially biasing results. Although it was emphasised during the handing out of the questionnaires that it was to be anonymous, the possibility of the "socially acceptable set" must also be considered along with the "need to be different set" found to be prevalent in some student groups (Anastasi, 1990).

Ideally when conducting psychological research, measures should be taken from the population to which the results might be generalised. In statistical terms one would aim to have a sample mean which is representative of the population mean. Unfortunately this does not always prove possible. In this case the population is the general public who might make use of a psychological or physical health service and the available subjects are students. Within these limits the students are used as a testing ground for the initial establishment of principles which may later be tested in the general population.

3.11 SUITABILITY OF QUESTIONNAIRES

As a central question of the current research is the content and clinical utility of the Sense of Coherence Questionnaire in comparison with the Dispositional Resilience Scale, these must be included in the battery. They are widely used to measure what are considered to be similar concepts (Antonovsky, 1987) and this is supported in part by the present findings although there are also some areas of difference such as the presentation of the questionnaires on varying numbers of sheets. Subjects reported that the Dispositional Resilience Scale (45 questions) which is presented on only one page, appeared shorter than the Sense of Coherence Questionnaire (29 questions) which is presented on four pages, thus increasing motivation to complete the battery. The fact that the selection of answers in the Sense of Coherence Questionnaire are different for each question does however make a shorter form of presentation difficult while maintaining legibility.

Further consideration is given to the other questionnaires in the battery in the following section.

3.12 EYSENCK PERSONALITY INVENTORY

Subjects did not report any difficulty with this questionnaire and the relevance of the relationship between personality and health questionnaires was found to be greater than first considered.

The Eysenck Personality Inventory was used to gather general information on personality and its relationship to health. It would appear to have increased

significance in the light of this new information on the possible link between neuroticism and what is measured by health questionnaires. Thus this instrument remained for the rest of the research.

3.13 GENERAL HEALTH QUESTIONNAIRE

This tool is commonly used in clinical practice to reveal levels of psychological distress and likelihood of need for further psychological input (Casey, 1990). As one of the aims of this study is to produce some clinically applicable evidence, the relationship of both the Sense Of Coherence Questionnaire and the Dispositional Resilience Scale to the General Health Questionnaire is important.

Sense Of Coherence Questionnaire, Dispositional Resilience Scale and Neuroticism are considered to be trait measures which crystallise in early adulthood while the General Health Questionnaire scores tend to improve with clinical input and are therefore a measure of state which may change over time. It would be expected that those with a strong sense of coherence or hardiness would tend to be healthier both psychologically and physically, thus scores on the General Health Questionnaire for a healthier person would, although dynamic, be expected to be within the range for persons with traits predisposing them to good health. This questionnaire is relevant, brief, has the advantage of being free of response bias (Casey, 1990), and is already well established in clinical practice. It also provides a tool which is sensitive to most affective disorders in one questionnaire as opposed to using a separate questionnaire for depression, anxiety etc. As there were no problems with its use in the pilot study it was maintained in future studies.

3.14 SUMMARY

Hypothesis 1 that total scores on the Sense of Coherence Questionnaire and Dispositional Resilience Scale would be positively correlated was supported and was in agreement with Antonovsky's (1987) predictions that sense of coherence and hardiness would be related. This provides another opportunity for this research to progress current knowledge on this topic as the Dispositional Resilience Scale itself has not, up until now, been compared with the Sense of Coherence Questionnaire.

Due to a lower than expected number of subjects **it was not possible to test hypotheses 2 and 3 that sense of coherence has one underlying factor and that hardiness consists of three independent factors.** This was tested later in the research once an appropriate number of subjects became available to carry out factor analysis.

Hypothesis 4 that both sense of coherence and hardiness are related to neuroticism was partially supported as a negative correlation was found to exist between the sores on the Sense of Coherence Questionnaire suggesting that the lower the sense of coherence or hardiness the person reported the stronger the reported score on the neuroticism scale. **Hardiness was not, however, significantly correlated with neuroticism.** It was also found that hardiness alone was positively correlated with scores on extroversion. This may explain part of the variance between the Sense of Coherence Questionnaire and the Dispositional Resilience Scale. The issue that these health questionnaires may inadvertently measure personality without offering any information unique to themselves was also considered in the light of comments (Funk,1992; Funk & Houston, 1987) about the potential for contamination of

questionnaire's by neuroticism and the high correlation between the Dispositional Resilience Scale and Extroversion. This was considered in future studies.

Hypothesis 5 that both sense of coherence and hardiness are negatively related to scores on the General Health Questionnaire (where high scores are indicative of psychological problems) **was supported**. This supports the claims that these questionnaires may have clinical utility as they are correlated with current psychological problems and also offers external criterion related validity. The question of what is offered above and beyond the shorter state measurement of the General Health Questionnaire remains an issue for future research. However, it appears clear that there is variance in the General Health Questionnaire which cannot be accounted for by Extroversion or Neuroticism.

Adding this aspect of the findings develops the model still further and somewhat undermines the suggestion that the measures of Sense of Coherence and Hardiness do not offer anything above and beyond personality questionnaires.

Hypotheses 6 and 7 that age and sex differences are evident in coping resources are not addressed here and will be included in the main study.

On the basis of the preliminary findings a number of studies were designed to investigate some of the specific issues which emerged.

The discriminant validity of the Sense of Coherence Questionnaire and the Dispositional Resilience Scale in relation to personality was the focus of the first study. Next, as no separate norms are provided for men and women for either of these measures, the effects of gender on the questionnaires was investigated and finally when a large enough group of subjects had been collected, the construct validity of the measures was investigated using confirmatory factor analysis. These are reported in the following chapters.

Chapter 4 CONTENTS

CONTENTS

TABLES

CONTENTS

FIGURES

CHAPTER 4

4.1 RELATIONSHIP OF HEALTH QUESTIONNAIRES TO PERSONALITY

Based on the conclusions from the pilot study and in an effort to collect a homogeneous set of data to assess which particular aspects of coping contribute to both the Sense of Coherence Questionnaire and the Dispositional Resilience scales, a second set of data was collected. Despite aiming to use a different type of subjects for future studies, the practicality of doing this proved more difficult than had first been envisaged. A similar class of Behavioural Science students was therefore asked to take part. The limitations which this entailed have been taken into account.

In the pilot study, only Sense of Coherence was found to be correlated with Neuroticism while only Hardiness was correlated with Extroversion. In order to further investigate the discriminant validity of the scales this relationship to personality was explored in the main part of the study reported here. The current section covers the results of the present sample. A paper written for this area of the research has, however, in response to suggestions made by journal editors and reviewers, included data from both the pilot data and the present data in order to increase the sample size and the reliability of the results. This can be found in appendix XIV.

4.2 NEUROTICISM AND PSYCHOLOGICAL WELL-BEING

Neuroticism is considered to be made up of an inherited biological tendency plus attributions which are used to interpret the meaning of the aroused state, thus leading to experienced emotion. A clear biological link has been made between neuroticism and pathology as over arousal of the autonomic system would eventually lead to exhaustion (Pinel, 1993). It might be expected that sensitive subjects who are characteristically emotionally labile will more frequently be measured in an emotionally extreme state such as anxiety, depression or mania. These mood disorders have also been clearly linked with biological processes such as the hypothalamic-adrenal axis (Goekoop, 1998). This combination of psychological problems plus biological propensity to have physical problems may have secondary effects on measures of their state of cognitive competence and life skills. It may be their lack of cognitive competence and life skills which result in their biological and emotional volatility or visa versa. Alternatively there may be 2 separate groups of people who overlap to a certain extent; those with poor life skills and those with biological and emotional volatility. The following study continues the examination of the clinical applicability of Sense of Coherence Questionnaire and the Dispositional Resilience Scale. After data collection in the pilot study the suggestion that health and well-being questionnaires are actually measuring Neuroticism indirectly was raised (Costa & McCrae,1987; Funk,1992), although no mention is made in the literature of Extroversion and its relationship to health questionnaires. Once again using the Eysenck Personality Inventory the possibility that they inadvertently measure personality traits such

as Neuroticism was investigated further. In particular the value of these scales over and above personality questionnaires is considered.

4.3 INFLUENCE OF NEUROTICISM ON SCORES ON SENSE OF COHERENCE AND HARDINESS

The concept of a sense of coherence is defined as a disposition to see the world as manageable and predictable while hardiness centres on the ability to cope individually with any situation and to see it as a challenge instead of a stressor. In many respects the dimensions of both these constructs are closely allied to the concept of helplessness as proposed by Peterson, Maier, and Seligman (1993) because not only is the cognitive interpretation of a situation important but also the ability to adapt. When adaptability is low the person is ill-equipped for the pressures and problems presented by the world at large. Costa and McCrae (1987) link this lack of adaptability to neuroticism, which they define as maladjustment and negative emotionality. A person who cannot retain control of emotional responses with respect to the stimuli and events may be inclined to see the world as difficult to manage and unpredictable which may in turn lead to low scores on the health questionnaires. Thus, emotional stability and control may be related.

Neuroticism is considered to be associated with anxiety (Roth, 1984), depression and low self-esteem (Teasdale & Dent,1987), reliance on anti-anxiolytic medication (Ashton, 1984; Ashton & Golding, 1989), supporting a relationship with mental pathology

and helplessness in particular (Ormel & Wohlforth, 1991). That the perception of the problem is as important as the actual problem is indicated by the work of Allred and Smith (1989), who note that Neuroticism is associated with exaggerated reports of somatic complaints, suggesting an element of hypochondriasis. Although this was not supported in the pilot study, Hardiness is generally reported as being highly negatively correlated with scores on measures of Neuroticism, (Funk,1992). It is also positively correlated to scores on measures of sense of coherence (Antonovsky,1993), a point which was supported by the findings of the pilot study. Scores on measures of sense of coherence are in turn strongly negatively correlated with scores on trait measures of anxiety, (Carmel & Bernstein,1989) which is linked with Neuroticism. Thus the link of Neuroticism and Sense of Coherence appears consistent with current literature.

4.4 BIOLOGICAL ASPECTS OF NEUROTICISM

Eysenck (1953) and Tellegen (1985) describe Neuroticism as a trait linked to inherited emotional lability of the autonomic system. The autonomic system is involved in somatic expression of emotional states through the sympathetic branch. Prolonged arousal of this area has been clearly related to physical and mental health problems as even basic textbooks on physiology of behaviour attest (Carlson, 1994; Pinel, 1993). Maranon (1924) and more recently Schachter and Singer (1962) and Forbes and Roger (1999) also related the cognitive and the somatic components of emotion. Cognitive attribution theory has in part developed from work examining the interpretation of arousal by subjects in varying

situations. This evidence suggests that those who are more emotionally labile are more likely to have negative cognitive processes of attribution. This has distinct similarities to Antonovsky's (1987) description of sense of coherence as related to mental and physical pathology.

4.5 SUGGESTIONS FROM THE LITERATURE THAT HEALTH QUESTIONNAIRES MAY BE MEASURING NEUROTICISM

As mentioned earlier, the relationship between responses to health questionnaires and Neuroticism has recently attracted much interest (Allred & Smith, 1989; Funk & Houston, 1987) and it has been suggested that reversed scoring obscures the relationship between the different factors which are linked to a common underlying variable. For example, a question measuring a negative relationship like alienation might be used to measure a person's feelings of involvement by reversing the obtained score. Thus a double negative is used to measure a positive attribute. Despite the Sense of Coherence Questionnaire having a majority of positively scored items reducing this problem, the revised Dispositional Resilience Scale although an improvement on earlier measures of hardiness still has this tendency.

4.6 INTERRELATION OF EXTROVERSION AND NEUROTICISM WITH SENSE OF COHERENCE AND HARDINESS

The association between responses to health questionnaires and Extroversion does not appear to have been given any consideration in the literature to date. Despite this, certain findings would appear to support the relationship of Hardiness to Extroversion found in the pilot study.

Gray (1981) considered that extroverts are more easily and efficiently conditioned with positive reinforcement while introverts are more influenced by negative reinforcement. As mentioned earlier, this suggests that those with increased Extroversion will be more likely to approach a situation if they believe there is the chance of positive reinforcement, while those with higher Introversion will be more sensitive to negative cues and thus to display greater avoidance. Thus extroverts may involve themselves in more risks and therefore have increased chances of both greater gains and greater failures. This may in turn give rise to more extremes of emotion than those who are introverted and who maintain a less risky and thus less labile lifestyle.

The higher Neuroticism score a person has the more likely they will be to become anxious and have negative thoughts about their ability to cope. This suggests that they will be more likely to believe that the outcome of a situation will be negative. In a similar way an introverted person may avoid a situation which involves social contact due to their negative beliefs about social involvement. Thus, their chances of increasing their feelings of self worth through positive encounters with other individuals is reduced and

introverted, avoidant, behaviour is reinforced. If introversion and neuroticism are both dominant characteristics, this tendency to avoidance may be exacerbated. This may explain why approach behaviour and a strong sense of coherence appear to be less prevalent in persons with increased Neuroticism scores.

Those with increased Hardiness scores, who believe that the situation may be within their control would appear to be more likely to involve themselves in the situation, and this characteristic may covary with increased levels of Extroversion. Alternatively those with increased Extroversion and thus increased positive feedback from involvement in their surroundings may develop increased Hardiness.

The apparent lack of a relationship between Extroversion and the Sense of Coherence Questionnaire in the pilot study may be due to the Sense of Coherence tapping in to different coping strategies from those assessed by the Dispositional Resilience Scale. This supports the discriminant validity of one measure from the other and suggests that each may have an individual role in the field of healthcare.

In the present study it was predicted that scores on both the Sense of Coherence Questionnaire and Dispositional Resilience Scale will be negatively related to scores of both Neuroticism and the General Health Questionnaire. It is further predicted that the Dispositional Resilience Scale alone will be positively related to Extroversion.

4.7 METHOD

The same battery of questionnaires as discussed in the pilot study was used in this study. This included the Sense of Coherence Questionnaire, Dispositional Resilience Scale, Eysenck Personality Inventory, and the General Health Questionnaire, 12-item version. A cover sheet was included for information about the age and sex of each individual.

4.8 SUBJECTS

A student sample ($n = 35$) was tested at the University of Abertay Dundee, Scotland. Five men were recruited, age range 19 - 38, mean age 27 and 30 women, age range 18 - 43,mean age = 23. Once again a first year Behavioural Science class was selected. Participation was voluntary. On the day of testing any students who did not wish to be tested did not attend class. The resulting sample was predominantly female which may be seen as biasing results as females often report themselves to be more anxious, moody and emotional than males (Strongman, 1987). Alternatively this may have been a self selecting group of individuals with, for example, higher levels of motivation for self improvement demonstrated through attending a voluntary class or increased extroversion if they believed that they might receive positive feedback about themselves (Gray, 1981).

4.9 RESULTS

The sample produced a wide range of scores on the respective scales with a slight negative skew in the overall distribution for Sense of Coherence Questionnaire. Due to both the negative skew and the ordinal data nonparametric statistics were used. One tailed tests were used as the present study aimed to further confirm the findings of the pilot study. The relationship between personality variables as measured by the Eysenck Personality Inventory and both Sense of Coherence and Hardiness was examined using Kendall's correlations.

Due to the number of correlations carried out the chance of finding one or more significant differences by chance alone is estimated at 98.65%. Using a Bonferroni Correction the alpha for each test is therefore lowered to $p<.001$ to bring the alpha level overall back to $p<.05$. It should be noted however that in reducing the chances of a Type I error the chances of a Type II error are increased (Howell, 1995) i.e. relationships which really exist may be missed. In order to try and avoid this some non significant results are discussed later in the study as potentially warranting further research before conclusions are made.

Table 4.1: Kendall's Correlation of Sense of Coherence Questionnaire Total Score With Neuroticism and Hardiness

Areas Correlated	Tau and Significance	
SOCQ / Neuroticism	- 0.43	p<.001
SOCQ / DRS	0.5	p<.001

Note: 29 females and 5 males were used in the statistics above. SOCQ = Sense of Coherence Questionnaire, DRS = Dispositional Resilience Scale. A Bonferroni adjustment was applied to these results and an alpha of p<.001 was set.
All non significant correlations between the Sense of Coherence Questionnaire, Hardiness, Extroversion, Neuroticism and the General Health Questionnaire are reported in appendix VII.

The results reported reveal the expected strong negative relationship between scores of sense of coherence and Neuroticism but none with Extroversion. Scores of hardiness once again did not show the expected negative relationship with scores of Neuroticism or scores on the General Health Questionnaire, they also did not have the predicted positive relationship with Extroversion.

The relationship between scores on Neuroticism and each separate question on both the Sense of Coherence Questionnaire and the revised Dispositional Resilience Scale was examined using Kendal's correlations with 2 tailed tests due to the investigative nature of these correlations. These are reported in tables 4.2 and 4.3.

Table 4.2: Kendall's Correlation of Sense of Coherence Questionnaire Items with Neuroticism

SOCQ Question	Tau and Significance	
12	- 0.46	p<.001
15	- 0.49	p<.001
22	- 0.49	p<.001

Note: 29 females and 5 males were used in the statistics above. SOCQ = Sense of Coherence Questionnaire. A Bonferroni adjustment was applied to these results and an alpha of p<.001 was set.

Table 4.3: Kendall's Correlations of Dispositional Resilience Scale Items with Neuroticism

D R S Question	Tau and Significance	
30	- 0.49	p<.001
39	- 0.61	p <.001

Note: 29 females and 5 males were used in the statistics above. DRS = Dispositional Resilience Scale. A Bonferroni adjustment was applied to these results and an alpha of p<.001 was set.

Of the 29 questions from the Sense of Coherence Questionnaire 3 were found to correlate negatively with Neuroticism at the p<.001 level, this figure increased to 10 if the certainty level was reduced to p<.01. Similarly 2 of the 45 questions from the revised Dispositional Resilience Scale were found to correlate negatively with scores of Neuroticism at the p<.001 level, this figure was increased to 10 if the certainty level was reduced to p<.01. Although a Bonferroni test has been applied here and the alpha level increased to p<.001, the items which correlated at the p<.01 level are also mentioned (see appendix VII for details) in an attempt to inform future studies and reduce the chances of

a Type II error occurring. It is noted that a larger sample may be necessary to verify these findings.

None of the items on either the Sense of Coherence Questionnaire or Dispositional Resilience Scale is positively correlated with Extroversion. The non significant results are detailed in appendix VII.

Examination of the questions with particularly high correlations with Neuroticism appears to reveal a link concerning interest in life appreciation and looking forward with enthusiasm.

(All questions listed below are scored positively).

DRS Q30 I often wake up eager to take up my life wherever it left off.

DRS Q39 Most days, life is really interesting and exciting for me

SOCQ Q12 Do you have the feeling that you are in an unfamiliar situation and don't know what to do ?

1 2 3 4 5 6 7

very often very seldom or never

SOCQ Q15 When you face a difficult problem, the choice of solution is:

1	2	3	4	5	6	7
always confusing and hard to find						always completely clear

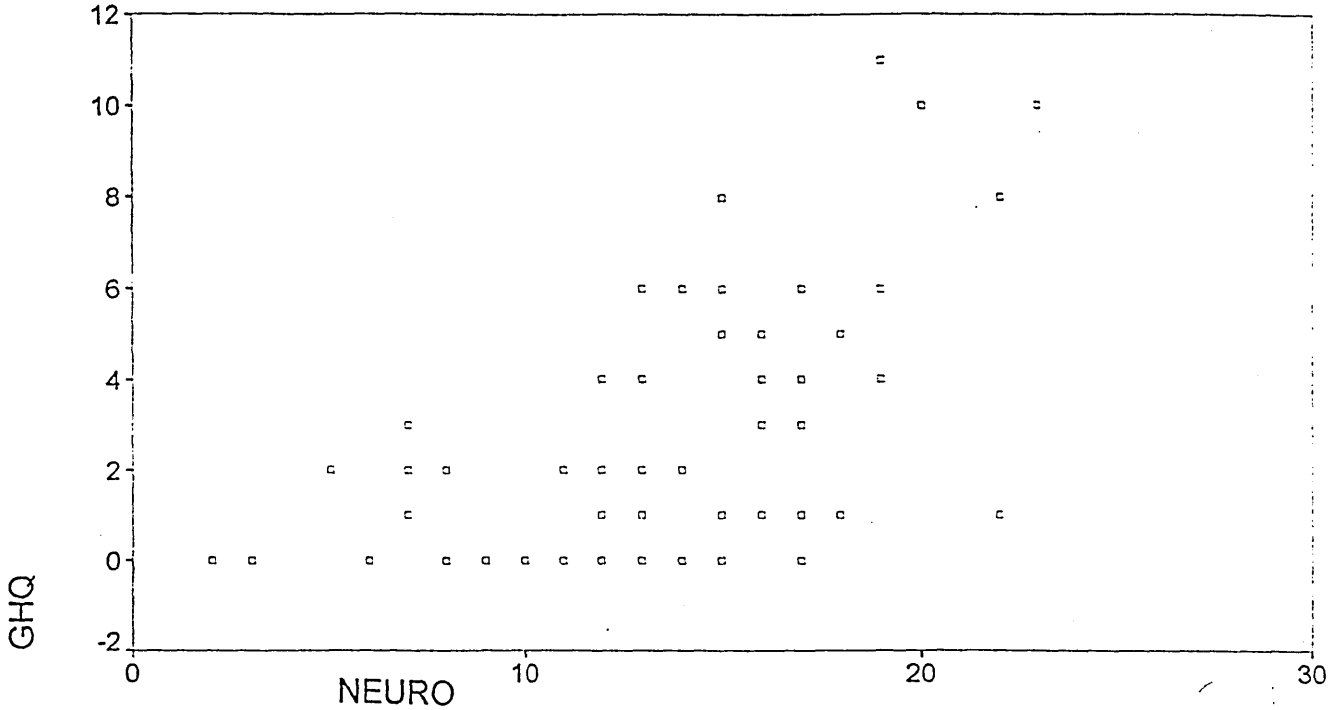
SOCQ Q22 You anticipate that your personal life in the future will be:

1	2	3	4	5	6	7
totally without meaning or purpose						full of meaning and purpose

Unlike the findings of the pilot study, no positive correlation was found between the General Health Questionnaire and Neuroticism for this sample.

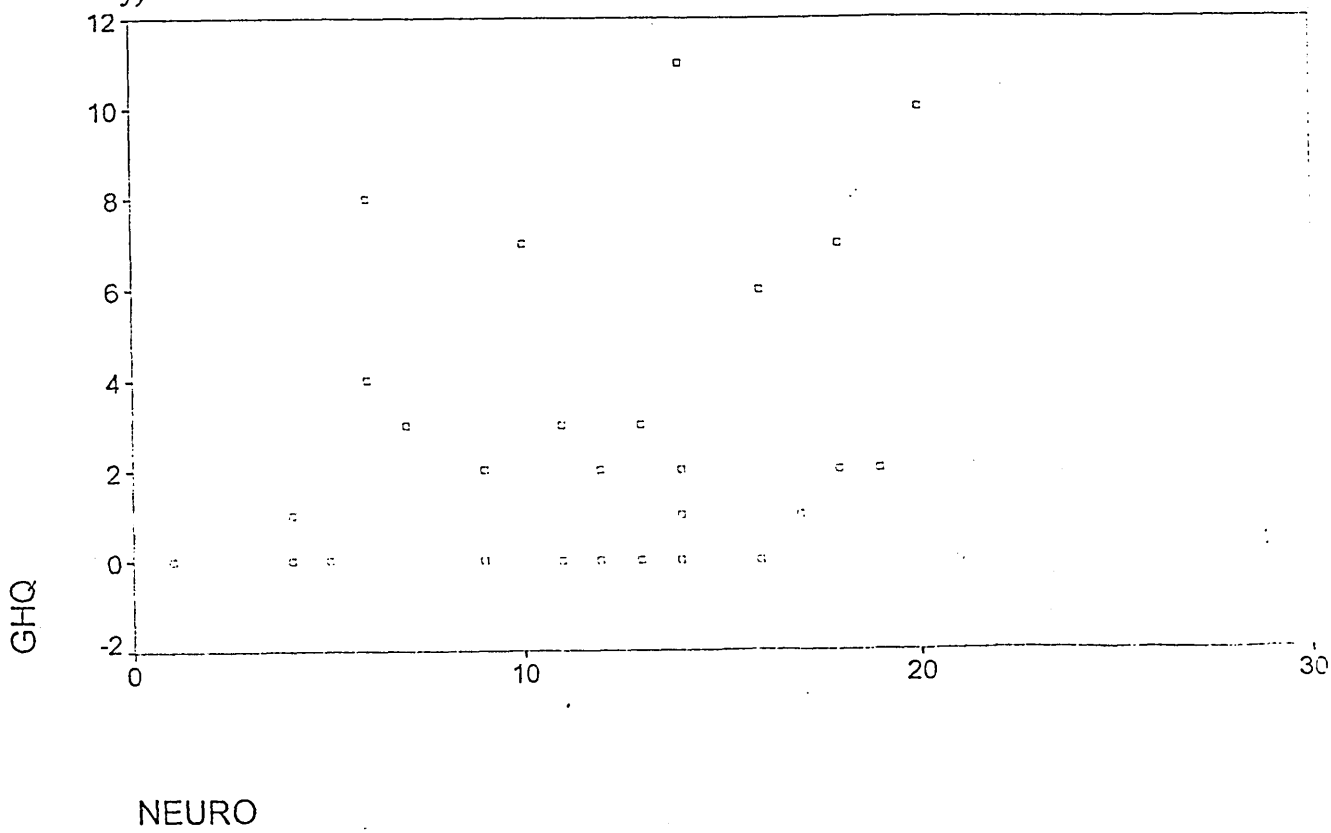
The relationship between what are considered to be trait scores on neuroticism and the state scores of the General Health Questionnaire were examined in more detail in a scatterplot to examine whether variations could be due to varying external influences on the 2 student groups. For ease of comparison scatterplots of the data from the pilot study are presented together with those from the present study in figures 4.1 and 4.2.

Figure 4.1 Scatterplot of Neuroticism and the General Health Questionnaire (Pilot)



This scatterplot was found to have a significantly linear relationship (F= 23.53, df =58, p<.0009)

Figure 4.2 Scatterplot of Neuroticism and the General Health Questionnaire (Current Study)



This scatterplot did not have a significant liner relationship (F= 1.49, df = 32, p< .231)

It can be seen from the scatterplots that the students in the current sample (figure 4.2) include some with lower scores on neuroticism and higher scores on the General Health Questionnaire, while in the pilot study (figure 4.1) a more linear relationship appeared to be present between scores on these 2 measures. As the Dispositional Resilience Scale was not related to the General Health Questionnaire in this study it is not possible to compare the pilot study with the present findings.

4.10 DISCUSSION

The findings indicate that contrary to the hypotheses made here and to past research (Funk, 1992), only the Sense of Coherence Questionnaire total score and not the Dispositional Resilience Scale total score appear to be indirectly measuring Neuroticism in the current group. It should be noted however that the large proportion of females to males along with the overall poor turnout of students to attend this voluntary class leading to a low number of subjects with perhaps higher than average motivation, may have influenced these findings.

That the early hardiness measures were based on male samples may have influenced the measurement of this construct such that it more accurately represents resilience in a male sample. The current sample has a notably smaller proportion of males to females than the pilot study which may also have influenced findings.

Among the items which did significantly correlate with Neuoticism in both health measures, it would appear that in this group at least, those with less interest in and enthusiasm for life to come have increased scores on neuroticism. In a similar student sample with similar sex division as the current one, MacLeod and Byrne (1996) reported that those with increased anxiety were found to predict more negative personal experiences while those who were both anxious and depressed predicted both more negative future experiences and fewer positive experiences than the control group. Thus the large proportion of females may have influenced scoring on neuroticism and its

relationship to psychological difficulties (Rim, 1987). It is possible that this aspect of sense of coherence may account for a large amount of the link with psychological disorders in females alone or in females students in particular. This is supported by the lack of a correlation between the Dispositional Resilience Scale scores and the General Health Questionnaire in this sample. This latter measure is considered to be a highly reliable and valid measure of affective disorder. These measures were notably significantly correlated in the pilot study which included a larger proportion of male subjects. Again the hardiness measure may be more attuned to male resilience.

Several other factors may have affected these findings. For instance, a larger number of subjects may be necessary in order to adequately sample the population under investigation and the current sample may, by chance, be somewhat biased. These findings may be particular to these students due for example to the fact that sample 2 had impending examinations while the pilot sample did not. This may have affected the state General Health Questionnaire scores and have overwhelmed the hardiness resources due to short-term, communally perceived stress. A final possibility is that the General Health Questionnaire or Dispositional Resilience Scale are not measuring what they claim to measure.

Findings support the criticism that reverse scoring on health questionnaires such as the hardiness scales obscures the relationship between the different factors which are linked to a common underlying variable. The Sense of Coherence Questionnaire avoids this problem as it is made up of a majority of positively scored items thus creating a more direct relationship. This direct relationship may account for the unique relationship which

Sense of Coherence has with external criterion such as the Eysenck Personality Inventory and the General Health Questionnaire in this study.

The relationship between emotional lability and processes of cognitive attribution as mentioned earlier parallel Antonovsky's (1987) description of scores on the measures of sense of coherence as related to mental and physical pathology. The relationships between Sense of Coherence, Neuroticism and the General Health Questionnaire revealed in the current research therefore tend to lend support to this position although clearly a causal relationship cannot be established between the somatic and cognitive components of emotion.

The number of questions from both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale which correlate significantly with Neuroticism suggests that this aspect of personality may account for at least a small amount of the variance in these measures. In the case of the Sense of Coherence Questionnaire this may be somewhat greater as the total score itself is highly correlated with Neuroticism. Thus there may be some doubt about the discriminant validity of the Sense of Coherence Questionnaire from Neuroticism, however, the current findings offer no support in relation to the Dispositional Resilience Scale being contaminated by this extraneous variable. This offers mixed support to Funk's (1992) criticism that health questionnaires may indirectly measure Neuroticism or that Neuroticism may be the intervening variable linking personality to health.

The suggestion that hardiness questionnaires were indirectly measuring Neuroticism has also been disputed elsewhere. Maddi, Bartone and Puccetti (1987) for example, concluded that the relationship between life events and health was not

confounded by emotionality. They concluded that high scores on Neuroticism would be linked to secondary health behaviours such as smoking which would lead to ill health but that it could not be considered to be a direct effect. This would still, however, lead to an expectation of a relationship between Hardiness and Neuoticism in the current study but would simply provide a different explanation for why it existed.

As mentioned earlier the predominance of females in the study sample must be seen as a potential biasing factor due to the belief (Antonovsky & Sagy, 1986) that each sex develops their sense of coherence at a different rate. As there appear to be differences in scoring trends for different populations (Kobasa in an interview with Wood, 1987; Antonovsky, 1993) development of norms is a clear priority. The potential for use of these questionnaires in both the clinical and the occupational setting is great if indeed they provide additional information to that measured by a personality inventory. Health questionnaires could be measuring concepts beyond those of Extroversion and Neuroticism but it would appear that it is necessary to provide further external validation for the health, as distinct from personality measures and to expand available research into the differences between these questionnaires.

As the state of the central nervous system affects neuroticism the effects of psychotropic drugs were felt to be possible extraneous variables in the Sense of Coherence Questionnaire scores and also in Dispositional Resilience Scale items which correlated with Neuroticism scores. This point must be borne in mind should these questionnaires be used in a clinical setting. Drugs which act on the autonomic nervous system such as anxiolytics can change levels of expressed neuroticism. This might also affect Sense of

Coherence Questionnaire / Dispositional Resilience Scale scores as can be see from the following examples. If people on medication became less depressed and more motivated scores on Commitment questions in the Dispositional Resilience Scale e.g.

8. By working hard you can always achieve your goals.

24. Thinking of yourself as a free person just leads to frustration.(reverse score)

or Comprehensibility and Manageability questions on the Sense of Coherence Questionnaire e.g.

13.What best describes how you see life: (Manageability, reverse scoring)

1	2	3	4	5	6	7
one can always find a solution to painful things in life						there is no solution to painful things in life

14.When you think about your life, you very often:

1	2	3	4	5	6	7
feel how good it is to be alive						ask yourself why you exist at all

might be artificially inflated, altering the profile of the persons underlying traits.

The hypothesis that Sense of Coherence Questionnaire and Dispositional Resilience Scale will be negatively related to the General Health Questionnaire was not

supported. The Sense of Coherence Questionnaire and certain items on the Dispositional Resilience Scale were both found to be associated with Neuroticism, while the General Health Questionnaire was not. The absence of any association between the General Health Questionnaire and this aspect of personality further suggests that it is tapping into elements of health and well-being which are independent of those measured by the Dispositional Resilience Scale and Neuroticism. The lack of relationship between the Dispositional Resilience Scale total score and both the General Health Questionnaire and Extroversion is not consistent with the pilot study. This might be explained if for example, Extroverion is related to resilience in mainly the males of the pilot group which might explain why the relationship between Hardiness and Extroversion is not found here.

4.11 COMPARISON OF PILOT AND CURRENT STUDY

Despite the variations between the pilot and current group which have been mentioned in the discussion, the data were considered on external journal review to be homogenous. It was therefore advised to combine these for the purposes of a paper. These combined results revealed slightly different findings from the individual smaller groups but should be considered within the light of earlier comments on the sex differences, external pressures in the form of examinations affecting the students in the second study and its small sample size.

The Sense of Coherence Questionnaire and the Dispositional Resilience Scale were still found to be negatively related to Neuroticism and the General Health Questionnaire as

predicted. Many of the individual questions from these questionnaires were still found to be associated with Neuroticism, however the removal of these questions from the scales removed any relationship with the General Health Questionnaire further confirming the suggestion that Neuroticism may be the intervening variable linking personality and health. See appendix XIV for further details.

4.12 SUMMARY OF FINDINGS

Although this study suffered from the associated problems of using a small number of subjects it, confirmed the hypothesis that Sense of Coherence is related to Neuroticism and that aspects of Hardiness are also related to this personality variable. The strength of the correlation between Neuroticism and the Sense of Coherence Questionnaire was such that it suggested some overlap between the 2 constructs raising questions about the discriminant validity of the health measures. It was found that before Bonferroni Correction that the Dispositional Resilience Scale total score was related to Neuroticism at the 99% certainty level. In an attempt to reduce the chances of a Type II error which might occur with such a small sample which is predominantly female, it was suggested that this be followed up with further research to verify the finding.

The hypothesis that Hardiness would be related to Extroversion was not confirmed. It was felt that the large proportion of females in this study when compared with the pilot study may have influenced this result due to the possible orientation of the hardiness measure to a male population.

The hypothesis that the Sense of Coherence Questionnaire and Dispositional Resilience Scale are related to the General Health Questionnaire was not supported. This cast some doubt on the relationship between these measures and psychological health as the General Health Questionnaire was included in the test battery to test external criterion related validity.

It is also possible as a further extraneous variable that the external influences of the university may have influenced findings for each group. Students in the second study were measured just prior to Christmas examinations while students in the pilot study did not have this imminent stressor. As the General Health Questionnaire is a state measure this would be more likely than scores on neuroticism, sense of coherence or hardiness, to register this change in external influences. This interpretation is supported by the scatterplots of the Sense of Coherence Questionnaire and the General Health Questionnaire at time 1 and time 2.

The issue of sex differences in scoring on the Sense of Coherence and Dispositional Resilience Scale is followed up in the next study.

Chapter 5 **CONTENTS** **Page**

Page

CONTENTS

TABLES

CHAPTER 5

5.1 THE EFFECT OF SEX DIFFERENCES ON INTERPRETATION OF SCORES ON THE SENSE OF COHERENCE QUESTIONNAIRE AND DISPOSITIONAL RESILIENCE SCALE

Despite worldwide use of the Sense of Coherence Questionnaire there are few examples of it being examined in relation to sex differences (Antonovsky & Sagy, 1986; Bernstein & Carmel, 1991;Anson, Paran, Neumann & Chernichovsky,1993, 13-Item Sense of Coherence Questionnaire). Similarly, in spite of the fact that the Dispositional Resilience Scale was developed using a single sex sample, an approach which is considered to lead to a biased knowledge base (Russo, 1991), it would also appear that there is no literature which addresses sex differences in relation to this measure. The subsets of scores for each gender, which might be used in a therapeutic situation, have not as yet been empirically tested and there are no norms for male or female responses. This would suggest that each sex is being evaluated on the basis of mixed sex information, potentially masking aspects of health related to gender or providing a false profile. In this way, people may look healthy when they are not and vice versa. The current section aims to explore the differences in response patterns for each sex in order to increase the normative base and improve the standardisation of these measures. A paper based on this section can be found in appendix XV.

5.2 SEX DIFFERENCES IN RELATION TO NEUROTICISM AND EXTROVERSION

As the possibility that the Sense of Coherence Questionnaire and the Dispositional Resilience Scale may inadvertently measure Neuroticism was suggested in the last study, sex differences in this area are of particular importance in validation of these measures. Neuroticism is the aspect of personality most commonly considered to increase psychological vulnerability (Brewin, 1988). For this reason, the suggestion that higher scores in neuroticism appear to be prevalent in women (Eysenck, Eysenck & Barret, 1995) leads to the consideration that this may influence female scores on the measures under investigation.

The varying perceptions of males and females, which are affected by their personality characteristics, are considered to influence health (Anson, Paran, Neumann & Chernichovsky,1993; Hutt & Weidner, 1993). Men are considered by some to be less anxious and conforming and more independent than women (Eysenck, Eysenck & Barrett, 1995; Money,1988) which appears to remain constant across age groups and nationality (Feingold, 1994), and also to perceive their physical health to be better (Anson, et al. 1993). This supports the increased prevalence of Neuroticism in women, however, as discussed below these findings are not as straightforward as they may first appear.

The suggestion that men are found to be more independent is questioned by Kaplan (1983) who raises the point that men who rely on someone else to clean, cook and find their socks for them are not seen by society as dependent. Thus in answering a questionnaire on manageability or control they may internalise these societal beliefs and report themselves as highly independent and capable. This may however, only refer to their work environment and not to their home life. Nonetheless, as success in the work environment is considered to be of increased importance to men this area of coping may be sufficient to increase over all perception of coping. Kessler (1979) for example, reports stress as inversely related to earnings for men and suggests that this is linked to loss of social status suggesting that for men, perception of success in this particular area of life is

of notable significance. Hammen, Mayol, De Mayo and Marks (1986) support this finding as they note that the personal meaning attached to a stressor is a key element in predicting depression. If the event is negative but not relevant to the person's self evaluation, it will be less likely to be meaningful and to result in depression. As the questionnaires under examination examine perceptions and not objective reality it would therefore appear that any sex differences in perception might affect scores. Thus, in the current example, as long as the man is successful in his chosen area of importance, they may continue to perceive themselves as coping and achieve high scores on these aspects of the measures.

Furthermore, the presence of Neuroticism may not be a completely negative factor. As mentioned previously, Rim (1987) reports that in a mixed sex study of coping styles, Neuroticism in the female group, covaries with areas of difficulty such as increased self blame, detachment and lack of problem focused coping but also with more helpful characteristics such as the ability to "focus on the positive" which is considered to aid personal growth. Similarly in the male group there is a positive relationship between Neuroticism, detachment and suppression but also with the seeking of social support and increased problem focused coping. Rim's overall conclusion is that the intercorrelations of coping methods are quite different for men and women which may have implications for scoring on measures such as the Sense of Coherence Questionnaire and the Dispositional Resilience Scale which assess perception of coping. Furthermore, the presence of neuroticism may not have equivalent effects on the mental health of each sex or on their self reports in the aforementioned measures. According to Rim's study this relationship between personality and both positive and negative coping strategies is equally prevalent in relation to Extroversion, although it should also be mentioned that Eysenck et al. (1995) in a later study, report that according to their findings, there are no sex differences in this personality trait.

Anson, et al. (1993) report that individual differences in health evaluation are affected not only by personality traits but also gender roles. They suggest that Comprehensibility is unlikely to develop in women who are socialised to put their family first in a culture which values achievement in paid employment and similarly that Manageability is unlikely to develop if the woman is socialised into dependence through caring for the family. Thus scores on the Sense of Coherence Questionnaire would be affected by the sex of the subject. It is also possible that similar risk factors might affect responses on the Dispositional Resilience Scale. Sex differences are reported in their findings, however, the 13-Item Sense of Coherence Questionnaire was used which offers only limited validatory information for the current study.

5.3 GENDER ROLES

Several models of gender differences in personality are reviewed by Feingold (1994); the biological model, the evolutionary model and the sociocultural model. According to the biological model, sex differences may occur as a result of hormonal, chemical or chromosomal differences (Eysenck, 1992; Zuckerman, 1991; Nolen-Hoeksema, 1987). This predisposes men to be more aggressive and dominant due to differing levels of gonadal hormones while women are found to be more inclined to develop depression, anxiety and neuroticism due to chromosomal vulnerability. An example of these biological differences is that the thicker corpus callosum in women may lead to greater integration of right brain visual and spatial abilities with left brain verbal abilities thus increasing intuitive skills (Martorano & Kildahl, 1989). This may contribute to the varying emphasis on communication in men and women if women find this an easier skill to master and may explain sex differences in use of social support (Argyle, 1987).

However there is also biological evidence that early hormonal coding does not produce unalterable sex differences but instead may change the threshold for sex-shared responses (Money, 1988). For example, he discusses the carer role, in which there may be a time differential between male and female carers response to a crying infant but once elicited the comforting behaviour is essentially the same. This threshold difference may explain to a certain extent the varying levels of anxiety in men and women. If women are more quickly stimulated by communication demands (Notman & Nadelson, 1991) and much more female than male time is spent in communication, then women may be more frequently under pressure from this stimulus. In this way they may have a different perception of social relationships and social support which may be reflected in the measures under consideration.

Alternatively, the evolutionary model proposes that physical differences have shaped enduring social roles which present day technology has in many ways rendered redundant. Although in earlier generations it was more difficult for women to work in the majority of jobs which involved heavy physical labour, the introduction of automation has greatly reduced the differences between the jobs which each sex is capable of performing. It is therefore easier for women to join the workforce, a life change which is found to improve mental health (McLanahan & Glass, 1985) although the issue of bearing children is still genetically determined and gynaecological problems continue to account for many of the health problems reported by women (Argyle, 1987).

The sociocultural model as discussed in the introduction is outlined by Feingold (1994) and considers gender differences to have been influenced by social expectations of each sex and the stereotypical way in which each is raised. In today's Western society however, it is interesting to note that the differences between the sexes, for whatever reason, are reducing (Martorano & Kildahl, 1989). Looking beyond Western culture however, Herdt's (1982; 1984) anthropological studies in New Guinea challenge gender

identity. Among the Sambia people boys from adolescence onwards, were found to spend around 10 years in homosexual relationships before marrying and becoming fathers with apparent lack of difficulty in moving between the roles. These findings suggest that Antonovsky's (1987) claims that the Sense of Coherence Questionnaire is free from socio-cultural bias, along with his apparent assumption that there are no gender differences as no norms are given for each sex, may not be substantiated. The gender roles and expectations of the Sambia people may be an extreme example but they highlight how cultural generalisations cannot be made. If for example sex difference are found in scoring patterns in the current study it would seem unrealistic to assume these findings would apply to such diverse cultures as that mentioned above.

It is not assumed that only one of the above models can be correct as in reality there is likely to be considerable overlap (Carlson,1994), with an interaction between the effects of environment, genetics, and the gender roles encouraged by society. If so many aspects of life are affecting health this has considerable implications for what needs to be measured to assess health and well-being. Thus following Anson et al.'s (1993) argument any of the aforementioned models of gender differences may affect scores on the Sense of Coherence Questionnaire or the Dispositional Resilience Scale. The effects on the scoring patterns of the questionnaires would, however, seem best kept as reference points for the culture from which they are taken.

5.4 GENDER DIFFERENCE ACROSS THE DEVELOPMENTAL SPAN

Although neither the Sense of Coherence Questionnaire nor the Dispositional Resilience Scale were designed for use with children, the authors' suggestion that both

areas of coping develop through childhood suggests that this may be an area for prophylactic input if the models and measures are found to be valid and clinically useful. It is therefore useful to consider within a developmental framework, any sex differences which may be found in the scoring patterns on the measures.

The recognition of separate developmental paths for men and women is quite a recent phenomenon. Notman (1991) reports that earlier research on development concentrated on male data and consequently defined any aspects unique to women as deviant. More recently however, the unique aspects of feminine development are being recognised and valued. Gender identity begins to develop as parents and carers begin to interact with the child as either male or female. This is supported by Money's (1988) findings concerning children born with what appears at the time to be non sex specific genitalia. In several instances it is subsequently discovered that they are actually physically the opposite sex from that initially defined. In these cases characteristics are more typical of the sex they are socialised into as opposed to what they biologically appear to be.

The developmental influence of social gender indentity begins to become evident as children interact with their peers. For example, Gilligan (1982) discusses the research of Mead (1934), Piaget (1965) and Lever (1976) which focus on early childhood. It was found that boys place a greater emphasis on rules, their application in games and involvement in larger groups, while girls concentrate on relationships and are more involved in interactions within smaller groups (even within the larger group). This is described as preparing each sex for the different roles they will take in later life where these early skills will be put to use in the adult world.

Reporting on a longitudinal study Gjerde (1995) suggests that sex differences are evident through early childhood into adolescence. Depressive symptoms in young men are found to be related to allocentric behaviour, undersocialisation and interpersonal problems

as early as pre-school and to autocentric, oversocialised and introspective behaviour in women which was not however distinguishable until adolescence. As further examples of these developmental sex differences Block, Gjerde and Block (1991) describe adolescent males as acting out when depressed while females become introspective. Depressed females are also found to report lower self esteem than depressed males, who tend to blame problems on external as opposed to internal causes. Margalit and Eysenck (1990) also considered the specific aspects of personality related to gender which we may potentially consider to affect health. They found that the identity crises related to gender, manifest themselves differently. Males had significantly higher Psychoticism scores reflecting issues of isolation, aggression and difficulty of impulse control. Their development of identity focused on individual achievement, knowledge, and task-oriented behaviour. Females had higher scores on neuroticism reflecting anxiety, moodiness, and introspection. Their identity developed around issues of relationships and other social behaviour. This is consistent with the findings of Block, et al. (1991) and can be related to specific health events such as the link of negative introspection with eating disorders, which are most common in adolescent females (Button, Sonuga-Barke, Davies & Thompson, 1996).

Thus throughout childhood into adolescence, the areas of importance to each sex appear to differ and varying areas of vulnerability are beginning to emerge.

These areas of vulnerability appear to continue into adulthood. For example, when examining the emphasis on external versus internal coping strategies it is frequently found that men, or those with traditionally masculine characteristics are generally more affected by success at work or in instrumental activities while women, or those with traditionally feminine characteristics are affected more by interpersonal success (Waelde, Silvern, & Hodges, 1994). This may partly explain why men become happier with age while women, especially those with children, become less happy (Argyle, 1987). For the working person,

frequently the man, the work environment becomes easier and more financially rewarding with promotions while the woman at home does not experience these benefits with age. The person working to keep the home may also feel that their role as carer is diminished as they reach the "empty nest" stage of life. The areas of life which are of most importance are, however, also areas where failure becomes more meaningful which suggests an area of potential vulnerability as well as success. This is supported by Waelde et al.s' (1994) study where the men report higher achievement stress, with this being related to increased suicidal ideation. The women, on the other hand, report higher scores on depression and increased suicidal ideation in the case of interpersonal stress. Thus gender differences in perception appear to be linked to the nature of the stressor, an area which is not taken into account by the current health questionnaires. This is supported by Russo's (1991) comments that effects from the interaction of sex -by- situation are more common than main sex difference effects. This may also be an extraneous variable in the scores of each sex on the Sense of Coherence Questionnaire and the Dispositional Resilience Scale. It should be noted, however, that it can only be inferred that those who report these areas of vulnerability in childhood go on to have similar problems in adulthood as it was not possible to locate any longitudinal studies which follow one mixed sex group from childhood through to later adulthood and assess gender differences in vulnerability and health.

5.5 EGO DEVELOPMENT

The emphasis on the differences in coping of each sex is reflected in the androgynous model conceived by Block (1973) who considered gender role to be linked to ego development. Thus for both men and women the acceptance of roles traditional to the opposite sex was accompanied by higher scores on ego development. This was unusual in that it proposed some value to the achievement of both the feminine and the

masculine aspects of identity, whereas the traditionally male attributes such as instrumentality and control are more commonly valued (Bursik, 1995). This suggestion that presence of both characteristics is of benefit is further supported by Lu and Wu's (1998) findings that traits of both masculinity and femininity reduce the risks of depression. Like the relationship between depression and traits of masculinity, the relationship between depression and traits of femininity was found to occur through their improvement of self esteem. If as inferred, although not stated, this sample was completely female, this does not support the benefit of female traits in a male population.

It is possible, therefore, that the combination of coping strategies measured by the questionnaires under investigation are inadvertently assessing aspects of both male and female orientated coping. Those with high hardiness and sense of coherence may be more ego developed and thus more androgynous in approach. If this is indeed the situation, the issue of gender specific subsets of scores may be less relevant. Alternatively those people with high levels of sense of coherence and hardiness are the people who have a good match in their lives between their available coping mechanisms and the range of problems which they generally encounter. This is one alternative hypothesis offered by Lu and Wu (1998) as their sample were nurses whom they suggest may have had a good match between their job characteristics and both their feminine and masculine traits thus creating a good mix of situation and resources. Feelings of control, coping and self esteem are therefore increased reducing mental pathology.

5.6 AREAS OF SIMILARITY IN COPING ACROSS THE SEXES

As the issue of sex differences has considerable political sensitivity and as it is possible that the measures under investigation may not be found to have sex differences in

scoring,it is important to note that there are also areas of similarity in health related behaviour across the sexes. In the case that no sex differences are evident in scores on the Sense of Coherence Questionnaire or Dispositional Resilience Scale, these similarities may offer a lead as to why this is the case and help to further clarify what these questionnaires are measuring. Bartone, Ursano, Wright and Ingraham (1989) report that in a group consisting mainly of men with low hardiness combined with high social support, stress was experienced as a result of working in a demanding job which they felt unable to stop due to social pressure which encouraged them to continue. Similarly Thomson and Wendt (1995) described a group of female student teachers in which they found that among those with low hardiness, social support increased their feelings of stress. This suggests similar areas of vulnerability across the sexes in relation to hardiness although the need for a mixed sex study is again highlighted. Clarke (1995) who does use a mixed sex group of students, reports that both age and hardiness scores were found to covary with vulnerability to illness but sex was not found to be contributory.

Aspects of personality are also found to covary with certain coping strategies in both sexes. Extroversion is positively related to problem focused coping, positive thinking, and wishful thinking, while Neuroticism is positively related to detachment, focusing on the positive and keeping feelings to themselves (Rim, 1987). Thus among those of both sexes with certain personality characteristics, similar types of coping, both adaptive and maladaptive occur.

Although the most common viewpoint is that depression is more common in women than in men (Nairne & Smith, 1984; Nolen-Heoksema, 1987) it is also considered that factors such as lack of paid employment and derived identity may influence and potentially bias these figures (Warren & McEachren, 1983). It is argued that after controlling for all such risk factors, that men and women are found to have equal incidence of depression (Harris, Surtees & Bancroft, 1991). This does not, however, fit well with the

theories discussed so far in this research. For example, unless men and women are found to have identical perceptual approaches to life, Harris et al's suggestion appears to be in direct contradiction to the model proposed on page 16 of the introduction. This model, in line with earlier findings (Allred, & Smith, 1989), proposes that perception acts as a filter through which a stimulus is assessed as either positive (e.g. a challenge) or negative (e.g. a threat) and that this perception has consequences for both mental and physical health.

Harris et al.'s (1991) claim is further challenged by Fennel (1997) who proposes that personal attributions and perception due to early life experiences are linked with self esteem which, as already mentioned, is linked to depression in both men and women (Lu & Wui, 1998). These sex differences in self evaluation are described by Ruble, Greulich, Pomerantz and Gochberg (1993) as one of the precursors in adolescence which predispose girls to increased depression. This reduction in self esteem then influences affective disorders (Fennel, 1997) such as those measured by the General Health Questionnaire in the current study. It therefore appears that when considering the various models of gender differences and the increased prevalence of Neuroticism in women (Eysenck et al., 1995) the lower self esteem of adolescent females (Block,et al.,1991) it is unlikely that both men and women would report similar levels of depression and anxiety. This difference in the levels of depression is supported by large sample studies such as Kessler, McGonagle, Swartz, Blazer and Nelson (1993) who examined over 8000 subjects in the USA and found that women had increased prevalence of major depression (1.7 : 1, women : men).

Nolen-Hoeksema (1990) reports that if all other factors in womens' lives were kept constant, their psychological health would not vary from that of men. Although this appears a valid and useful point to consider at the sociological level, at the clinical level where the person is already presenting with a complete socio-economic package, it is rare indeed that input may change these circumstances. It therefore appears important to focus on the actual presentation of the clients seen until the socio-economic patterns or the area of psychological input changes. Thus although keeping all other things equal, men and women may have similar psychological health, all other things in reality are not equal and it is a disservice to each sex to ignore the differences which appear to exist. There is, however, also a suggestion of some areas of similarity across the sexes in relation to personality and hardiness which should be considered when interpreting findings in the current study.

5.7 RELATIONSHIP OF SENSE OF COHERENCE AND HARDINESS TO SEX ROLES

As a final point before examining the hypotheses in this study it would appear from the description of the dimensions of both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale, that these may be measuring aspects of coping which relate more to male or female coping strategies. The Sense of Coherence Questionnaire comprises three elements of Comprehensibility, the extent to which a persons world makes cognitive sense; Manageability, the primary resources which a person has at their own disposal or the secondary resources at the disposal of a family member, friend or colleague from whom he may seek help; and Meaningfulness, the emotional counterpart of

comprehensibility which considers the extent to which a person sees their life as offering opportunity which is worthy of their investment of self as opposed to a threat. This is notably different from the Dispositional Resilience Scale as it includes the social aspect of coping. Not only does the person assess what they themselves can cope with but also what can be managed within their social network. This aspect of coping appears more typical of the female approach which uses social support (Argyle, 1987). The Dispositional Resilience Scale on the other hand comprises three elements of Control, the belief that a stressful situation is within the person's ability to cope; Challenge, the ability to see change as normal, and presenting an opportunity; and Commitment, the ability to view a situation as meaningful, interesting and worthy of self investment. Each of the three latter elements can be seen as directly linked to what are commonly considered to be male coping strategies. These are more concerned with operating out on the environment and demonstrating competency, power, self confidence, independence and increased self involvement as opposed to relational concerns in order to avoid affective disorders (Ruble, et al., 1993). These can be seen as more applicable to the work environment than to social relationships.

On the basis of these models and examples, it can be argued that men's and women's perceptions of health status, personality characteristics, and domains of importance for life achievement appear to vary considerably. It would therefore follow that areas of coping might be different for men and women. It may even be necessary to go beyond the male female split to look at different combinations of characteristics in order to adequately refine health assessment. In the current study however, the division is limited to gender differences.

5.8 HYPOTHESES

It is hypothesised that gender differences exist in the subsets of scores on both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale, in the personality traits and in their relationship to psychological health as measured by the General Health Questionnaire.

5.9 SUBJECTS

Data were collected from 306 Open University students attending summer classes. All participants were anonymous volunteers and were informed that the study was part of a health research project that would be of interest in their curriculum. Sixty-seven men were recruited, aged between 21 and 71 years of age, and 239 women, aged 19 to 66 years.

5.10 METHOD

A battery of four questionnaires was given in random order and administered to the whole group; Sense of Coherence Questionnaire (Antonovsky, 1987), Dispositional Resilience Scale (Bartone,Ursano,Wright & Ingraham,1989), Eysenck Personality Inventory (Eysenck & Eysenck, 1964), and the General Health Questionnaire, 12-question version (Goldberg & Williams,1988).

5.11 RESULTS

Given both the nondirectional nature of the hypotheses and the ordinal nature of the data, nonparametric statistics and two-tailed tests were used. Due to the number of correlations carried out the chance of finding one or more significant differences by chance alone is estimated at 99.9%. Using a Bonferroni Correction the alpha for each test is therefore lowered to $p<.001$ to bring the alpha level overall to a more reliable level. It should be noted however that where Bonferroni Correction has been applied, reducing the chances of a Type I error increases the chances of a Type II error (Howell, 1995) i.e. relationships which really exist may be missed. In order to try and avoid this some non significant results are discussed later in the study as potentially warranting further research before conclusions are made.

Initially the data were examined using a Mann-Whitney U test, for sex differences based on a linear relationship between the scores however this revealed no significant sex differences. The non significant results are listed in appendix VIII.

The next step was to examine the non-linear relationships between scores which may have been affected by the sex of the subjects. The sample was divided at the median into groups with high or low scores on the Sense of Coherence Questionnaire, Dispositional Resilience Scale and Eysenck Personality Inventory, the total scores of the other elements of the battery were then assessed for sex differences using a Mann-Whitney U test. As there is a great disproportionality between the available data for each sex this may be seen as biasing the statistical tests. Although 17 results initially appeared to reveal sex differences at the 99% certainty level this was reduced to only 3 after Bonferroni Correction. As at least some of these results may be indicative of Type II error

the need is highlighted for further investigation in this area in order to reduce the chance of false negatives occurring.

The distribution of scores from this sample can be found in appendices IX and X. Results are shown below in Table 5.1.

Table 5.1 Sex Differences in Scores on theTest Battery Among Those With High or Low Scores on Health and Personality Questionnaires as Divided at the Median

Variable With Sex Differences	Group With Higher Score	Median of Variable	25th and 75th Percentile (Men)	25th and 75th Percentile (Women)	Number of Subjects	Mann-Whitney U	Areas Divided Into High and Low
Age	M	M=36.5 F=35	30 47	29 45	M=32 F=98	955***	Low Meaning < 35
Meaningfulnes	F	M=35 F=35	30 38	33 39	M=32 F=98	929***	Low Meaning < 35
Neuroticism	F	M=10 F=12.5	8 15	8 16	M=33 F=104	1064***	Low Extra < 12

Note. Extra = Extroversion; F = female; M = male; Meaning = Meaningfulness; Neuro = Neuroticism. *** = $p < .001$. A Bonferroni adjustment was applied to these results and an alpha of $p<.001$ was set.

The results in table 5.1 reveal that despite the lack of sex differences between total scores on all the measures, division of these into high and low scoring groups suggests that minimal areas of sex difference may exist in the pattern of scoring in the current sample of subjects. Among the few areas of sex difference which have emerged from the results there is, however, no consistent picture.

Among the scores on sense of coherence there are significant sex differences in scoring in only the low Meaningfulness group. In this group men are found to be older

than the women, while the women are found to have significantly higher Meaningfulness scores. As this is not a longitudinal study, however, the age differences may reflect a cohort effect. Among the personality scores there are sex differences between those with low scores on extroversion as females are found to have significantly higher Neuroticism. In the low Neuroticism group the level of significance in the sex differences reaches only $p<.01$. No difference at all is found among those with high scores on either Extroversion or Neuroticism. There are notably no sex differences in either the high or low categories of scores on the General Health Questionnaire. All other non significant results can be found in appendix VIII.

As personality and in particular Neuroticism, were highlighted as possible extraneous variables in the previous study the groups with low scores on both extroversion and neuroticism have been investigated further using Kendall's correlations. The results of this are reported in tables 5.2 -5.5.

Table 5.2 Kendall's Correlations (2-Tailed) Between Sense of Coherence and Dispositional Resilience Scale Total Scores and Dimensions, and General Health Questionnaire Among the Female Groups with Low Scores on Neuroticism (Tau)

	CH	CM	CO	Comp	Man	Mean	SOC TOT	Neuro
CO		.42***						
HTOT		.65***	.52***					
Man		.23***		.43***				
Mean					.27***			
SOC TOT				.51***	.64***	.44***		
Extra						.33***		
Age	.27***							
GHQ				-.36***			-.26***	.26***

Note : CM= Commitment; CO = Control; HTOT= Dispositional Resilience Scale total score; Comp= Comprehensibility; Man = manageability, Mean = Meaningfulness; SOCTOT = Sense of Coherence Questionnaire total score; Extra = Extroversion; Neuro = Neuroticism; GHQ = General Health Questionnaire.102 women made up the sample for all statistics above. All non significant results are reported in appendix VIII.

Table 5.3 Kendall's Correlations (2-Tailed) Between Sense of Coherence and Dispositional Resilience Scale Total Scores and Dimensions, and General Health Questionnaire Among the Male Groups with Low Scores on Neuroticism

	CH	CM	CO	HTOT	Comp	Man	Mean	SOC TOT
CO		.47***						
HTOT		.75***	.6***					
Comp		.49***						
Man		.4***		.41***				
SOC TOT		.48***		.43***	.63***	.6***	.55***	
Extra	.57***							
Neuro					-.64***			-.46***

Note : CM= Commitment; CO = Control; HTOT= Dispositional Resilience Scale total score; Comp= Comprehensibility; Man = manageability, Mean = Meaningfulness; SOCTOT = Sense of Coherence
Questionnaire total score; Extra = Extroversion; Neuro = Neuroticism; GHQ = General Health Questionnaire. 36 men made up the sample for all statistics above. All non significant results are reported in appendix VIII.

Table 5.4 Kendall's Correlations (2-Tailed) Between Sense of Coherence and Dispositional Resilience Scale Total Scores and Dimensions, and General Health Questionnaire Among the Male Groups with Low Scores on Extroversion

	CH	CM	CO	HTOT	Comp	Man	Mean	SOC TOT
CM	.47***							
CO		.65***						
HTOT	.48***	.86***	.76***					
Comp			.4***	.42***				
Man		.52***	.57***	.61***	.56***			
Mean		.68***		.59***				
SOC TOT		.55***	.51***	.6***	.76***	.8***	.5***	
Extra	.46***							
Neuro					-.73***	-.51***		-.6***
GHQ		-.4***		-.44***			-.44***	-.41***

Note : CM= Commitment; CO = Control; HTOT= Dispositional Resilience Scale total score; Comp= Comprehensibility; Man = manageability, Mean = Meaningfulness; SOCTOT = Sense of Coherence
Questionnaire total score; Extra = Extroversion; Neuro = Neuroticism; GHQ = General Health Questionnaire. 36 men made up the sample for all statistics above. All non significant results are reported in appendix VIII.

Table 5.5 Kendall's Correlations (2-Tailed) Between Sense of Coherence and Dispositional Resilience Scale Total Scores and Dimensions, and General Health Questionnaire Among the Female Groups with Low Scores on Extroversion

	CH	CM	CO	HTOT	Comp	Man	Mean	SOC TOT	Neuro
CM	.3***								
CO	.3***	.48***							
HTOT	.53***	.7***	..68***						
Comp		.34***	.54***	.47***					
Man	.38***	.44***	.52***	.56***	.61***				
SOC TOT	.34***	.39***	.53***	.53***	.76***	.76***	.26***		
Neuro		-.37***	-.49***	-.49***	-.58***	-.58***		-.55***	
GHQ		-.28***	-.36***	-.28***	-.34***			-.36***	.4***

Note : CM= Commitment; CO = Control; HTOT= Dispositional Resilience Scale total score; Comp= Comprehensibility; Man = manageability, Mean = Meaningfulness; SOCTOT = Sense of Coherence Questionnaire total score; Extra = Extroversion; Neuro = Neuroticism; GHQ = General Health Questionnaire. Between 92 and 95 women were used in all statistics. All non significant results are reported in appendix VIII.

In tables 5.2- 5.3 the groups with low scores on neuroticism are reported. In the female group alone the General Health Questionnaire was found to be negatively correlated with the sense of coherence total score and not with Hardiness. It is also notable that in the male group the General Health Questionnaire was negatively correlated with the hardiness total score, although only reaching 99% certainty level, while it is not at all related to Sense of Coherence.

There appears to be more of an overlap in what Hardiness and Sense of Coherence are measuring in the male group as the total scores are positively correlated. Commitment is also correlated with Manageability and Comprehensibility. The only overlap between the 2 measures in the female group is between Commitment and Manageability.

In the female group alone the General Health Questionnaire was found to be positively correlated with Neuroticism. Meaningfulness was also found to be positively correlated with Extroversion.

With reference to personality men were found to have a positive correlation between Extroversion and Challenge, and a negative correlation between Neuroticism and both Sense of Coherence and Comprehensibility.

In tables 5.4-5.5 the groups with low scores on extroversion are reported. Unlike the low Neuroticism groups both Sense of Coherence and Hardiness are related to the General Health Questionnaire scores for men and women. The General Health Questionaire score is uniquely negatively correlated with Control and Comprehensibility in the female group while it is uniquely negatively correlated with Meaningfulness in the male group. This score is negatively correlated with Commitment in both male and female groups.

Hardiness and Sense of Coherence total scores are also highly correlated in both groups. Commitment and Meaningfulness are correlated in only the male group while Commitment and Comprehensibility are correlated in only the female group.

Examining the personality elements Neuroticism is positively correlated with scores on the General Health Questionnaire and negatively correlated with Hardiness in the female group alone. It is negatively correlated with the Sense of Coherence total score and all dimensions except Meaningfulness in both the male and female groups. Extroversion is correlated with Challenge in the male group alone and is not related to any element of the battery in the female group.

5.12 DISCUSSION

The main findings from the current study are that are sex differences exist in scoring patterns on both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale but that no clear picture emerges from these results. The interrelation of personality and sex in scores on both measures is evident in both sex differences in scoring and different areas of correlation in the groups with low scores on both neuroticism and extroversion. As mentioned in the results section an effort is made to avoid the potential for Type II errors after use of a Bonferroni Correction by considering some of the results which reach 99% certainty for possible future replication. The main findings of interest are outlined below.

5.12.1 SEX DIFFERENCES IN INTERPRETATION OF SCORING

In the group with lower scores on neuroticism the sense of coherence total score is negatively correlated with scores on the General Health Questionnaire for women but not for men. The hardiness total score is negatively correlated with scores on the General Health Questionnaire (at the 99% certainty level) for men but shows no relationship at all in the female group. The need for replication of the findings in relation to the male sample is recognised because of the small sample size used, however, should these findings be

replicated, it is suggested that women with lower scores on neuroticism might more effectively examine their psychological health through the use of the Sense of Coherence Questionnaire while the men with lower scores on neuroticism might gain a clearer perspective through use of the Dispositional Resilience Scale. Consideration of neuroticism in parallel with the questionnaires under investigation may therefore offer a more detailed analysis of coping in relation to health.

This significant relationship between psychological health and scores on the Sense of Coherence Questionnaire in the female group, and the possible relationship between psychological health and scores on the Dispositional Resilience Scale in the male group, supports the earlier observation that the elements of the Dispositional Resilience Scale may be more in line with individual coping strategies which are traditionally considered to be used by men while the Sense of Coherence Questionnaire has more questions which are traditionally more closely associated with female coping such as group support. It should be noted however that Antonovsky (1987) considered the need for individual control, in contrast to seeking help from a community, to be a characteristic of Western culture as opposed to a sex difference. This may have influenced the content of the Sense of Coherence Questionnaire and may as a result make it a more relevant measure of female coping only in Western society.

This has direct clinical relevance as for example the use of the Sense of Coherence Questionnaire to measure a man who has a low Neuroticism score may inadvertently misclassify him as having low resilience. This may occur as his coping strategies may be more individually orientated than the measure is able to assess. Thus the measures' lack of sensitivity in a certain area may lead to false negatives, for example, erroneously pinpointing someone as in need of therapeutic input. In a culture of extremely limited finance such as the current National Health Service this would lead to ineffective use of resources. Equally a women with low Neuroticism may be misclassified due to the inability of the Dispositional Resilience Scale to assess her social support network which is

so vital in her perception of coping day to day. In both cases this may result in input being focused on development of coping skills which in reality may be of little benefit as they do not fit with the perception and underlying schemas i.e. life rules of the individual. These findings directly contradict Antonovsky's (1987) aims to create a gender free measure and highlight an unaddressed area in the literature on Dispositional Resilience Scale.

5.12.2 INTERRELATION OF SCORES ON THE HEALTH MEASURES IN RELATION TO PERSONALITY AND SEX

As mentioned in the introduction Neuroticism is found to be more prevalent in women (Eysenck et al., 1995) and to be the aspect of personality most commonly considered to increase psychological vulnerability (Brewin, 1988). These findings in combination with Funk's (1992) comments that it may be a contaminating element in health questionnaires would lead to the expectation that sex differences in scoring might be evident in relation the health measures. The current findings are, however, equivocal.

Despite the fact that consideration of personality may be useful in interpretation of the scores on the Sense of Coherence Questionnaire and Dispositional Resilience Scale it does not appear that there is any evidence for the confounding nature of Neuroticism in relation to male or female scores. For example, in the low Neuroticism group, scores on the General Health Questionnaire were correlated with Neuroticism and Sense of Coherence in the female group but Neuroticism and Sense of Coherence were not correlated with each other. This suggests that the relationship between the Sense of Coherence Questionnaire and affective well-being is not totally explained by neuroticism. These findings were not replicated in the male group as although Neuroticism and Sense of Coherence were correlated, neither of them were correlated with scores on the General Health Questionnaire. Thus sex differences were evident but in each case there appeared

to be no relationship with psychological well-being and no evidence that Neuroticism further confounded these.

Turning next to the areas in which no sex differences are evident between the groups, it would appear that there are no significant differences between male and female scores among those with high scores on both Extroversion and Neuroticism. It is possible that Rim's (1987) research may offer some explanation. As mentioned in the introduction this suggests that in both men and women certain aspects of personality are found to covary with certain coping strategies both adaptive and maladaptive. For example, among the adaptive strategies those with high Extroversion might be expected to report increased problem focused coping and positive thinking while those in the high Neuroticism group might be expected to report detachment, focusing on the positive and containment of feelings.

This does not, however, explain the negative relationship between Sense of Coherence, Hardiness and Neuroticism. As this personality construct is most commonly associated with increased pathology (Ormel & Wohlfarth, 1991; Teasdale & Dent, 1987) it is would appear more likely that the negative coping responses with which it is associated may still outweigh the positive. These negative aspects of a high score in Neuroticism such as increased anxiety and hostility may be equally overwhelming for men and women and also contribute to the lack of sex differences in this group. Once again it would appear that consideration of the scores on the health measures without measuring personality may lead to erroneous assumptions. If these findings are replicated it would appear that both men and women with high scores on Extroversion and Neuroticism would benefit from consideration of the scores on the Sense of Coherence and Dispositional Resilience Scale as similar across each sex while those with lower scores on the personality measures may have more individual profiles for each sex.

5.12.3 SEX DIFFERENCES IN SCORES ON SENSE OF COHERENCE DIMENSIONS

Although there were no differences in the total scores in the Sense of Coherence there were certain sex differences in the scores on the dimensions. In the groups with lower scores on comprehensibility and manageability women were found to have higher scores on neuroticism than men (at 99% certainty level). If it is possible to replicate these findings to a significant level, this suggests that the presence of a higher neuroticism score in women may indicate deficits in these coping resources. These aspects of coping can in turn be linked to affective disorders. For example, those who find life to be more of a threat than a manageable challenge are more likely to feel low on internal locus of control (Rotter, 1966) and increased depression. The predictions made by someone with low manageability and comprehensibility are more likely to be negative which according to Fennel (1997) will then link into maladaptive behaviour and anxiety, confirming the negative predictions, which then lead to self criticism and depression. It is also possible that increased Neuroticism might inhibit development of these skills or alternatively that some biological predisposition may lead to parallel development of these constructs. For example, a person born with less ability to comprehend their world will be less likely to find it manageable. In this situation it is possible that increased hostility, avoidance and anxiety might develop as traits in order to cope with the environment leading to increased scores of neuroticism.

After the division of scores on Meaningfulness into high and low, the females in the low Meaningfulness group had significantly higher scores than the males and the males

in this group were found to be significantly older. In the low Extroversion group Meaningfulness was negatively related to scores on the General Health Questionnaire for men and in the low Neuroticism group Meaningfulness was positively correlated with Extroversion for women.

The Meaningfulness dimension of sense of coherence assesses the extent to which a person sees their life as offering opportunity which is worthy of their investment of self. It includes questions on relationship issues and on the person's ability to appreciate life without necessarily controlling the environment. For example,

Q22. You anticipate that your personal life in the future will be:

1	2	3	4	5	6	7
totally without meaning or purpose						full of meaning and purpose

Q14. When You think about your life, you very often:

1	2	3	4	5	6	7
ask yourself why you exist at all						feel how good it is to be alive

It is possible that the pattern of higher scores for women in this area might be explained by the suggestion that women have increased concern with interpersonal issues (Gjerde, 1995; Gilligan, 1982). This social component may also account for the link with Extroversion as those who are extroverted would be expected to be more outgoing and to make more social contacts. Meaningfulness may therefore be a protective coping resource through its association with social support. Social integration increases positive affect which is more common among females than males and is considered to be a buffer against depression (Margalit & Eysenck,1990; Argyle, 1987). This does however contradict the earlier theory that women may be more frequently under pressure from communication as

they are more quickly stimulated by demands of this type (Notman & Nadelson, 1991) or at least suggests that there may be a positive and a negative side to social support as a coping mechanism.

Meaningfulness may also be protective in relation to the males in the current sample as demonstrated by its relationship with scores on the General Health Questionnaire. These findings may, however, be due to a cohort effect as we do not have a longitudinal study across time, making any findings in relation to age less valid. Furthermore, as personal meaning in a situation is found to be the key element in psychological problems (Hammen, et al., 1986) it may be that having moved away from the traditional work role where for example, stress is related to earnings for men (Kessler, 1979) this group may have developed other areas of meaning in their lives by becoming involved in study at a mature age. In this way use of Open University students who are older and have made some major life changes in returning to study, may have resulted in a sample of more ego developed and therefore more androgynous people (Block, 1973). These aspects of traditionally male and female coping may therefore be protective in both sexes (Lu and Wu, 1998) resulting in fewer sex differences being evident in scoring on the measures in the current battery.

5.12.4 SEX DIFFERENCES IN SCORES ON THE DISPOSITIONAL RESILIENCE SCALE

There were no significant linear or non linear sex differences evident in scores on the Dispositional Resilience Scale. In the low Neuroticism group, however, Hardiness scores are positively related to Sense of Coherence Scores for the male but not the female group. This sex difference in findings further confirms that at least in relation to the current sample there is no consistency in the overlap between what the total scores in these 2 questionnaires measure. It is also notable that despite the correlation between these measures in the male group, neither measure correlates significantly with psychological well-being although the scores on the Dispositional Resilience Scale reach 99% certainty. Thus once again sex differences are only evident when scores are considered in conjunction with personality. The validity of the Dispositional Resilience Scale is challenged in both the male and female groups with low scores on neuroticism, as, if these findings are not indicative of Type II error, Hardiness is not related to psychological well-being and has questionable clinical utility for either sex.

Among the low Extroverison groups Commitment, Meaningfulness and scores on the General Health Questionnaire correlated in the male group while Commitment, Comprehensibility and scores on the General Health Questionnaire correlated in the female group. It is therefore possible that Commitment relates to coping in both males and females while Comprehensibility and Meaningfulness respectively are more representative of what males and females find necessary in their lives to commit, invest themselves and maintain positive mental health. As mentioned earlier it is possible that the unexpected relationship of Meaningfulness and scores on the General Health Questionnaire in the male

group may be due to a cohort effect among more ego developed and hence androgynous individuals.

5.13 CONCLUSIONS

It would appear from the current findings that consideration of the scores on both Sense of Coherence and the Dispositional Resilience Scale in conjunction with personality may offer a clearer picture of any sex differences in scoring. It is hoped to include personality in a factor analysis in the next study in order to clarify the amount of variance for which these constructs account in the health measures.

As the sex differences which have been highlighted here in conjunction with personality appear in the dimensions of the Sense of Coherence Questionnaire and the Dispositional Resilience Scale, this raises several issues.

Firstly, having divided the sample into those with high and low personality scores, similar scores on the measures do not appear to offer similar information on a male or female subject. For example, in the Dispositional Resilience Scale, question 25, "Trying your best at work really pays off in the end", it is still less likely today that women will be working in outside employment than it is for men, therefore the validity of what is being asked and how it is construed by the respondent may bias results. The fact that both Antonovsky (1987) and Bartone et al. (1989) have ignored sex differences, the effects of personality and made no reference as to whom these measures may be aimed at, appears to be a significant problem in assessment of these measures validity. It may be necessary to take these findings further and to produce a personality and lifestyle profile in order to interpret findings on the measures under investigation. How such profiles would relate to scores suggests much future work before the measures might be clinically valid or useful.

The second issue is the acceptance of these dimensions as individual entities within the current literature on the validity of the measures. The components of Sense of

Coherence have been found to produce only one general factor (Flannery, & Flannery, 1990) and the factor structure of the Dipositional Resilience Scale is still under debate (Bartone, et al., 1989). Within these constraints the theory that for example, women with increased Neuroticism scores may have deficits in the areas of Manageability and Comprehensibility, would not have empirical evidence to back it up. The question of whether the dimensions of these measures can be valid and reliable if used independently remains unanswered. At best the current research must be considered as offering a lead to an aspect of coping which may be differentiated in men and women and highlighting the need for further research into the factor structure of the questionnaires in order to more accurately assess sex differences in scoring.

It is unclear from the current study what has lead to the low number of sex differences in the measures under investigation as the review of literature in the introduction would lead to the expectation that coping and perception of coping in each sex would vary considerably. Some theories on why these findings may have occurred are covered below.

Firstly the low number of male subjects may have lead to non significant results which were in reality Type II errors. Use of Bonferroni's Correction is an area of debate among statisticians as it can lead to an over conservative view of results and this may have affected the current findings. Attempts have been made to reduce the potential error by discussing notable non significant results with a view to future research.

The measures themselves which are being investigated may not be adequately reliable and valid to highlight any sex differences which do exist. If for example differing meanings are taken from the same question due to lack of precision in wording, the questionnaire will not validly measure what it is intending to measure across a sample. Equally, interpretation of meaning in the items may have been influenced by the type of subjects and their current life situation. Once again turning to the earlier example of the Dipositional Resilience Scale, question 25 "Trying your best at work really pays off in the

end". In the current sample many of the subjects may not be in employment. It will therefore be unclear if some have reinterpreted the question to refer to trying hard in their current endevour, i.e. studying or whether they have answered the question as if they felt it was not relevant to them at all.

The combination of strategies measured by the questionnaires may assess aspects of coping which cover both the traditionally masculine and feminine aspects of coping. This may go some way to explaining the lack of sex differences. As the presence of traits which are commonly considered to be both masculine and feminine may be protective against psychological problems (Lu & Wu,1998) this would fit with Antonovsky (1987) and Bartones' (1989) claims about the measures in relation to resilience. Lu and Wu (1998) also suggest that a good match between what is demanded of people day to day and their available masculine and feminine aspects of coping may result in high reported resilience and no sex differences. This may be the case with the current sample. Alternatively the current sample may be more mature, ego developed and therefore androgynous (Block, 1989) in their coping styles. Although it is difficult to explore further what form they may take, the possibility of cohort effects exists and longitudinal research of these issues across various samples of subjects is implicated.

Chapter 6 **CONTENTS**

CONTENTS

CONTENTS

CONTENTS

TABLES **Page**

CONTENTS

CONTENTS

FIGURES

6.1 EXAMINATION OF THE UNDERLYING CONSTRUCTS WHICH MAKE UP SENSE OF COHERENCE AND HARDINESS

6.2 INTRODUCTION

In this final section construct validity of the Sense of Coherence Questionnaire and the Dispositional Resilience Scale is assessed using confirmatory factor analyses (CFA). This technique is applied in an effort to advance the findings of studies carried out so far using exploratory factor analysis (e.g. Flannery & Flannery, 1990; Frenz, Carey & Jorgensen, 1993; Bartone, Ursano ,Wright & Ingraham, 1989).

Factor analysis is a method of data reduction used to examine the common underlying themes in a group of questions. This study aimed to use this process to clarify some of the questions which still surround the factor structure and inter-relation of dimensions in these measures (Funk & Houston, 1987; Funk, 1992; Antonovsky, 1993).When using confirmatory factor analysis, hypotheses about the factor structure are based on a theoretical model and are therefore more specific (Harman, 1976). This enables the researcher to specify the model in advance and to statically assess the fit of this in comparison to the research data. Kim and Meuller (1978) argue that this increase in the number of empirical constraints reduces the likelihood that a given covariance model will support the hypotheses erroneously. As all aspects of the analysis are clearly defined it also makes accurate replication easier. This has been a notable difficulty in the current literature which investigate these questionnaires, as in many cases exploratory factor analysis is used without clear statement of which rotation was applied or what criteria were used for assessing factor loadings.

Results from an earlier section in the research suggested that Neuroticism may be a confounding variable in the relationship between each of these measures and affective well-being. It was therefore planned to assess the extent of this relationship

using the Eysenck Personality Inventory and the General Health Questionnaire within the confirmatory factor analysis.

6.3 SENSE OF COHERENCE QUESTIONNAIRE AND DISPOSITIONAL RESILIENCE SCALE : ARE THEY UNIFACTORIAL OR MULTIFACTORIAL ?

In the following section the models of hardiness and sense of coherence as proposed in the literature to date are discussed. As there are a number of contradictions in these studies a summary table will be reported at the beginning of both the sense of coherence and hardiness sections in order to clarify the points covered.

6.3.1 MODELS OF HARDINESS

Whether the construct of hardiness is unifactorial or multifactorial appears to remain unclear today. The diversity of models proposed in the literature demonstrate the lack of clarity which surrounds this construct. For example Kobasa (1979) the original author, initially reports 3 interrelated hardiness factors while she is later reported as suggesting the existence of 3 independent factors (Kobasa & Maddi, 1982, personal communication in Hull, Van Treuren & Virnelli, 1987). These and other contradictions within the literature are presented below in table 6.1.

Table 6.1: Models of Hardiness

Author	Model	Hardiness Measure	N	Sample	Sex
Kobasa, Maddi & Kahn, 1982	Unitary construct after removal of cognitive structure subscale	UHS	259	Managers	M
Funk & Houston, 1987	2 factors (subscales factor analysed)	*1Composite Qre	120	Psychology Students	M
Pollock & Duffy 1990	2 factors	HRHS	389	Physically Ill e.g. Multiple Sclerosis, Diabetes	M+F
Kobasa, 1979	3 interrelated factors	*2Composite Qre	**200 from original 837.	Managers	M (+ 22 F from 837)
Kobasa & Maddi, personal communication, 1 November, 1982 reported in Hull, Van Treuren & Virnelli,1987)	3 orthogonal factors (subscales factor analysed)	NA	NA	NA	NA
Hull, Van Treuren & Virnelli,1987	Commitment, Control & Challenge not consistently correlated with each other in a 3 factor model	UHS	162	Students	NA
Bartone,Ursano, Wright & Ingraham,1989	3 factors related with 1 general factor of hardiness	DRS	787	Bus drivers	NA
Bartone,Ursano, Wright & Ingraham,1989	3 factors related with 1 general factor of hardiness	DRS	111	Army Officers	NA

Note: DRS = Dispositional Resilience Scale; UHS = Unabridged Hardiness Scale;HRHS = Health Related Hardiness Scale. NA = Not available in the literature; M = Male; F = Female.

*1:Composite of five scales; Alienation from Work, Alienation from Self, Powerlessness,(Maddi, Kobasa & Hoover, 1979); Security scale of the California Life Goals Evaluation Schedules (Hahn, 1966); External Locus of Control.(Rotter, Seeman & Liverant, 1962).

*2:Control dimension was measured through Internal-External Locus of Control scale, Powerlessness versus Personal Control Scale and Nihilism versus Meaningfulness scale, both of the Alienation Test , Achievement scale and Dominance scale both of the Personality Research Form (Jackson, 1974), Leadership Orientation scale of the California Life Goals Evaluation Schedules. Commitment dimension was measured by the Alienation test, Role Consistency Test from the Gergen and Morse (1967) Self Consistency Test. Challenge dimension was measured by the Preference for Interesting Experiences and Security Orientation scales both of the Hahn measure, the Vegetativeness versus Vigorousness and Adventurousness versus Responsibility scales both of the Alienation Test, Need for Cognitive Structure and Need for Endurance scales both of the Personality Research Form.

** 100 subjects were selected to be in each of the high stress/ high illness and high stress/ low illness group. The number of subjects was reduced after a request from the company. The 22 females were removed, 322 low stress cases, 40 high stress / high illness cases whose peak illness came before their peak stress, 10 borderline cases from each group. Around half the subjects in each group (50) were used to test the hypotheses about group differences in hardiness.

6.3.2 ELEMENTS WHICH MAY HAVE CONTRIBUTED TO LACK OF CONSTRUCT VALIDITY

It is clear from examination of table 6.1 that researchers appear to be obtaining different results in relation to the factor structure of hardiness. As suggested in earlier studies (Allred & Smith, 1989) and also in this research neuroticism may have a confounding effect on hardiness as a construct, in relation to psychological well-being. As their is some contradiction on this issue in the literature this remains an area of debate. For example, Challenge, Control and Commitment were found to predict appraisal of health post childbirth, independently of Neuroticism, among prenatal women, while total hardiness score was not predictively valid (Priel, Gonik & Rabinowitz, 1993).

Despite other areas of health research being found to be contaminated with this element of personality (e.g.Grossarth-Maticek, 1989; Grossarth-Maticek & Eysenck, 1990; Amelang, Schmidt-Rathjens & Matthews, 1996) the authors of the hardiness measures have not addressed this issue in the 20 years since its inception.

The possibility of sex differences in response patterns discussed in the last section, particularly in relation to personality, may be contributing to these problems of construct validity. If researchers such as Hull, Van Treuren and Virnelli (1987) use mixed sex groups but do not distinguish between the scores of men and women, this may explain some of the difference in findings between researchers.

Some further aspects which may be contributing to the lack of construct validity are that some of the measures discussed above developed in parallel, rather than in collaboration, with the original authors (e.g. Pollock & Duffy, 1990) and were therefore variations on the hardiness theme. Even among the measures which did include input from the authors originally involved in development of hardiness, not all based their alterations on earlier findings (e.g.Kobasa, Maddi & Kahn, 1982). These elements may be considered as a major contributor to the contradictory

findings. Turning to the development of hardiness it is possible to trace the origins of some of these problems.

6.3.3 CONSTRUCTION OF THE HARDINESS THEORY

Antonovsky (1987) criticises the use of items in the Alienation From Self Scale (Kobasa & Maddi, 1982) which lack clarity. It is unclear in the following example whether the question refers to the respondent themselves or is a general life observation (e.g. The attempt to know yourself is a waste of effort). This may result in inaccuracy in what is being measured. This is in sharp contrast to the use of Guttman's Facet Theoretical Design where each word is carefully considered (see page 47).

It is possible that the method of construction may also have affected the construct validity. Kobasa (1979) appears to have considered the benefits of the individual elements which make up hardiness and indeed these have support in the literature.

For example Rotter, Seeman and Liverant (1962) suggest that those who feel they have increased **control** over situations which they encounter are less likely to suffer detrimental effects from the experience. Antonovsky (1974) discusses how those with increased **commitment** have a sense of purpose and feeling of community in a stressful situation which protects them from the effects of stress. Finally Fiske and Maddi (1961) consider that those with increased **challenge** appear to seek out novelty and explore their environment while attempting to achieve life goals. They therefore have better access to resources to aid them and motivation to see a situation as offering opportunity as opposed to threat.

The area of difficulty is, therefore, the total lack of evidence as to why these particular aspects of coping were considered the key elements in comparison with any others which may have influenced health.

Having made the decision that the 3 dimensions of control, commitment and challenge would constitute hardiness various measures considered to represent the 3 dimensions were tested out (see Kobasa, 1979, page 8). Those which discriminated between managers with high stress / high illness and high stress/ low illness, were accepted as measuring the new concept of "hardiness". These were lack of alienation from self (considered as commitment), sense of vigorousness (measured through lack of vegetativeness), meaningfulness (measured through lack of nihilism) powerlessness and internal as opposed to external locus of control.

This stage of the developmental process appears to have provided further problematic areas in relation to the construct validity of the measure. The decision that discrimination between high stress / high illness and high stress/ low illness would be the criterion for inclusion of scales was not maintained. Hull et al. (1987) note that of the six scales listed below which made up the *Unabridged Hardiness Scale, only 3 (Alienation From Self, External Locus of Control, Powerlessness) distinguish between high and low illness in Kobasa's (1979) original study.

(1) Alienation From Work Scale (Maddi, Kobasa & Hoover, 1979)

(2) Alienation From Self Scale(Maddi, Kobasa & Hoover, 1979)

(3) External Locus of Control Scale(Rotter, Seeman & Liverant, 1962)

(4) Powerlessness Scale (Maddi, Kobasa & Hoover, 1979)

(5) Security Scale (Hahn, 1966)

(6) Cognitive Structure Scale (Jackson, 1974) (removed as a later refinement to the scale).

Furthermore Hull et al. (1987) report inconsistencies between their own findings that the Powerlessness Scale included in the Unabridged Hardiness Scale (UHS) loaded on Commitment and those of Kobasa and Maddi (personal communication ,1 November, 1982 reported in Hull, Van Treuren & Virnelli, 1987) which suggested that the Powerlessness Scale loaded on Control, highlighting inconsistency in the scale. It was also reported that the security scale recommended as a measure of Challenge by Kobasa and Maddi (1982) did not consistently load on any

one factor. The 6 scales of the UHS were later reduced to 5 after the Cognitive Structure Scale was found to share no variance with the other scales (Kobasa et al., 1982). It can be seen therefore that the criteria for inclusion of scales did not remain consistent and that the scales themselves did not appear to be reliably loaded on the dimensions they were considered to measure.

6.3.4 COHORT EFFECTS

Use of male managers in the design stages of the measure (Kobasa, 1979) without consideration of the issues of sex or role differences may have resulted in cohort effects being built in to the measure. Control, for example, may be a more important issue to a manager than to staff. As much of the research has continued with this population (e.g. Kobasa, Maddi & Courington, 1981; Kobasa et al., 1982; Kobasa, Maddi & Zola, 1983) the question of applicability of findings across other subject groups is raised as a potential element which might undermine construct validity.

This may explain some of the differences in findings as different sample groups as well as different measures, have been used. For example the Health Related Hardiness Scale (Pollock & Duffy, 1990) was used with a mixed sex, physically ill sample of adults and the Abridged Hardiness Scale (Rhodelwalt & Zone, 1989) was used with female ex-students of a small western liberal arts school. In this way measurement of the construct has not been standardised which adds to confusion about the resulting model and reduces availability of valuable normative data.

Use of alternative measures considered to measure hardiness may also play a part in the apparent lack of construct validity. This may be partly due to the copyright imposed upon the measures which increases researcher cost, reduces access and encourages development of parallel measures. This makes the comparison of like with like extremely difficult.

It is also possible that the findings might be domain specific to the work environment and that asking someone who works at home questions about work which is presumed to involve considerable interaction with bosses and colleagues may simply be nonsensical.

The later development of the Dispostional Resilience Scale (Bartone et al. 1989) based partly upon data from bus drivers may equally result in cohort effects. Meijman and Kompier (1998) for example report that city bus drivers come from a high stress occupation characterised by high demands, low control and low support. Basing development of a measure which includes a component of control, upon those with a level of control which is lower than average, may therefore have biased the items selected to form the hardiness construct.

6.3.5 CONSIDERATION OF HARDINESS AS A UNITARY CONSTRUCT

Consideration of the dimensions of hardiness measures as contributing to a single global score of hardiness may provide misleading data. Hull et al. (1987) comment that it is unclear what benefit this has and that information on the individual dimensions may be missed as a result. This is further supported by Carver (1989) who suggests that there can be only 2 reasons for using the composite score. The first is similar to that which was tested in the current study using CFA, that the underlying construct (manifest variable) is assessed indirectly by the latent variables (items, scales). By increasing the number of latent variables the maximum number of aspects of the construct may be covered. The second is that like a gestalt, the construct is more than the sum of its component parts. He refers to this as a synergistic model.

In the case of hardiness, the factor analytic studies available in the literature offer questionable support that the construct is measured through latent variables. In all but one instance there is no empirical evidence that the composite hardiness score offers anything beyond the individual components. Hull et al. (1987) report one study in which the Abridged Hardiness Scale (AHS) is used with students and findings

suggested that the composite hardiness score was slightly better at predicting depression than Commitment. In a further study, however, where the longer form (UHS) was used, Commitment was better at predicting depression. An explanation for this may be that the dimensions in the Abridged Hardiness Scale becomes less reliable with the reduction of items. Anastasi (1990) states that reliability of any measure will increase the larger the sample of valid items used. The weight of research has, however, found the dimensions to be more useful than the composite score.

For example Compton, Seeman and Norris (1991) found that Commitment and Control correlated with self concept and the presence of a positive self bias, an attributional style which has been linked with lower incidence of depression (Argyle, 1987), Challenge on the other hand was negatively correlated with both Commitment and Control. If, as outlined by Kobasa et al., 1982) each dimension did contribute to a single hardiness score it would be expected that Challenge would also correlate with self concept and the presence of a positive self bias. However, the findings of Compton et al. (1991) suggest that Challenge may be an independent element contributing to a lack of unity in the model. Carver (1989) points out that the separate components which make up the composite hardiness score are not equally useful as Challenge remains uncorrelated with health outcomes.

Despite the shortcomings, the use of a single hardiness score continues in the most recent third generation measures - the Personal Views Survey produced by the Hardiness Institute in 1985 and the Dispositional Resilience Scale. In a review by Hull et al. (1987) it was suggested that intercorrelations of Commitment and Control with Challenge have improved with the Personal Views Survey but are still considered to be inconsistent. This consideration of hardiness as a single global construct may, therefore, contribute to the current construct validity of the Dispositional Resilience Scale.

6.3.6 IMPLICATIONS OF CURRENT HARDINESS SCORING TECHNIQUES

The method of scoring frequently used with the composite score approach is that the hardiness score is split into high and low as divided at the median (Funk, 1992). It appears, although it is not stated, that this is based on Carver's synergistic model mentioned above (section 6.2.4) where an interaction between variables is assumed. Without this, a person might score well above the median on one dimension while scoring relatively poorly on the other 2 dimensions, thus artificially creating a high composite hardiness score. This might lead in turn to a false prediction of improved coping. As an example of this a person may feel high internal locus of control and thus score highly on the control dimension, however, they may also feel that they have little or no commitment to their lives. They may therefore have no future plans or goals and may become alienated due to their lack of involvement in life. According to Beck, Weissman, Lester and Trexler (1974) this lack of a future plan is highly associated with suicidal behaviour while alienation is associated with vulnerability to disease (Moss, 1973). It would therefore seem erroneous to assume that a person with high scores on Control but low scores on Commitment, has as many coping resources as someone who has increased Control and Commitment unless these variables interact so that high scores in one area would assume high scores in another. Once again this has not been addressed empirically and leaves a gap in the model.

6.3.7 REVIEW OF FACTOR ANALYTIC STUDIES OF HARDINESS

The use of factor analysis in the hardiness literature has at times lacked clarity in the methods of reporting adding further to the problem of construct validity.

For example, Kobasa, Maddi and Puccetti (1982) report that a principal components analysis was carried out on the subscales in the UHS using a sample of 259 middle managers. Their findings were that one main factor accounted for 46.5% of the variance while cognitive structure accounted for 18.5% of the variance in the

only other factor. Separate correlations suggested that all subscales, except cognitive structure, were interrelated. It is not stated, however, which type of rotation was used with the principal components analysis or what the criteria were for deciding upon whether a factor loading was significant. Both of which are considered necessary for replication (Breakwell, Hammond & Fife-Schaw, 1995). In addition the sex of the sample is not mentioned. Factor loadings are reported for the first factor only (External locus of control .67, Powerlessness .89, Security .44, Cogntive structure -.01, Alienation from self .78, Alienation from work .85).

If, despite all the changes to the measures mentioned earlier there has been a consistent model of hardiness throughout, it would be expected that replication of the factor analyses reported by Kobasa, et al. (1982) using updated measures with the cognitive structure items removed, would provide the same model of one general factor of hardiness. Although it is not specifically stated in the Kobasa, Maddi and Puccetti (1982) paper, they present a model which encompasses the interrelated dimensions and a general hardiness factor.

The main problem with the Kobasa, Maddi and Puccetti (1982) study is that the subscales as opposed to the individual items were factor analysed . This assumes that the individual items if left unconstrained (i.e. not attached to a scale) would still load on those subscales which may not be the case. This is also the case for 2 other studies (Funk & Houston, 1987; Manning, Williams & Wolfe, 1988) which will therefore not be compared with those where items were factor analysed.

Evidence from studies where items were factor analysed separately is that in 6 different studies using 3 generations of hardiness measures (Dispositional Resilience Scale, Bartone et al., 1989; Abridged Hardiness Scale, Revised Hardiness Scale and the Unabridged Hardiness Scale, Hull et al., 1987), the factor analysis of the items consistently produced 3 factors. This is unexpected due to the various inconsistencies which appear to have occurred in relation to development of the measures.

Lack of clarity in the reporting of the factor analyses is also a problem in the Bartone et al. (1989) study. It is not possible to review the loadings and inter-relation

of the factors as they are not available in the literature. The Dispositional Resilience Scale is firstly described as a modified version of the hardiness measure available from the Hardiness Institute in 1984. No name is given for this measure although reference is made to its use in earlier studies (e.g. Kobasa, Maddi & Kahn,1982) therefore it is assumed that it is the Unabridged Hardiness Scale. It is not clear from the new scale presented in Bartone et al. (1989) which aspects of the original scales have been modified and incorporated, only that the new measure correlates -. 93 with the original version and no longer uses a majority of negative indicators in order to measure the dimensions. Details of the factor analyses are also lacking. It is reported that a varimax rotation is used with the principal components analysis which produced 3 factors.

Breakwell, et al. (1995) suggest that use of principal components analysis with orthogonal rotation in the field of psychology may often be a default choice and may be evidence of an ill considered design. Furthermore they advise that a varimax rotation is often erroneously referred to as the simplest form of rotation and may therefore be overused. This they feel may lead to inaccurate results as few constructs in psychology are totally unrelated. Although Bartone et al. (1989) do advise that a reductionist approach should not be taken when considering the dimensions of the Dispositional Resilience Scale few other details are given. It is not, for example, reported whether an oblique rotation, which would allow the factors to correlate, was tried or considered. Furthermore it is not stated what criterion was used for deciding upon whether a loading is significant or not, how much variance the factors accounted for or what the loadings of the factors were. This makes an accurate repeat of this analysis impossible and casts doubt on the findings reported.

Hull et al. (1987) used the UHS and carried out a principal components analysis with an oblique rotation which allows the factors to correlate. All items which loaded .3 or above on only one factor were reported. They found that Commitment was measured most precisely as all items loaded on the first factor. Control was less well defined as 11 of 16 Control items made up this factor, 2 items

loaded on the Commitment factor and 2 on the Challenge factor. Challenge as reported throughout appeared to be ill defined with only 4 items from this dimension loading on the third factor. The eigenvalues associated with these factors were 4.68, 2.56, and 1.95 respectively and they accounted for 26% of the variance which is a minimal amount. These findings suggest a model of 3 interrelated factors with one general factor of hardiness.

Each study here has used exploratory factor analysis in which the researcher examines what emerges from the analysis and makes an interpretation based on their theoretical knowledge and expectations (Harman, 1976;Thurstone, 1947). As mentioned earlier, the advantage of CFA is that it allows the researcher to specify the model in advance and statistically assess the fit. Each of the models suggested by the literature and research on hardiness was therefore tested in the current study using CFA.

6.4 MODELS OF SENSE OF COHERENCE

The models in table 6.2 are based on the research and theory on sense of coherence. Similar to the Dispositional Resilience Scale there are contradictions in the literature which are summarised below.

Table 6.2: Models of Sense of Coherence

Author	Model	Measure	N	Sample	Sex
Flannery & Flannery (1990)	1 main factor	SOC29	M=24 F=71	Mature students	M+F
Antonovsky (1987)	1 general factor with 3 contributory related factors. Pilot study, qre development	SOC29	51	Israeli nationals who had experienced trauma e.g. concentration camp survivors, severe disability, bereavement.	M+F
Antonovsky (1987)	1 general factor with 3 contributory related factors	SOC29	297	Israeli nationals	M+F
Petrie & Brook (1989)	3 orthogonal factors	SOC29		This reflects use of the measure for clinical research purposes among high risk clients and not findings	
Frenz, Carey & Jorgensen (1993)	5 factors which reduced to 1 general factor after a further principal components analysis	SOC29	374	Students,various social service employees, clincal sample of acute & chronic clients with psychological problems	M+F
Unpublished Studies					
Holme, Ehde, Lamberty, Dix Thompson (1988)	1 main factor	SOC29	NA	Students	NA
Pottie (1990)	1 main factor	SOC29	NA	Students	NA
Dana, Hoffman, Armstrong & Wilson (1985)	1 main factor	SOC29	NA	Students	NA

Note: NA = not available in the literature; SOC29 = 29 item Sense of Coherence Questionnaire
As there are so few published factor analytic studies unpublished studies are also reported, however, it should be born in mind that these have not been peer reviewed and few details are available.

6.4.1 FACTOR ANALYTIC STUDIES OF SENSE OF COHERENCE

It is clear from table 6.2 that the sense of coherence is widely considered to consist of one main factor. The structure and inter-relationship of the dimensions has not, however, been well investigated in published studies using factor analysis (Frenz, Carey & Jorgensen, 1993). This highlights the need for investigation of the construct validity, an issue which is raised by Antonovsky (1993). This becomes particularly important in the light of the wide use of the measure in at least 20 countries. Continued use of the Sense of Coherence Questionnaire without further research into the existence of the construct as outlined by Antonovsky (1987), renders the findings of the research which uses the measure as questionable.

The benefit of the consistent use of the Sense of Coherence Questionnaire in its original form has enabled comparison of like with like across studies. However, the two published studies available which report the use of principal components analysis with the Sense of Coherence Questionnaire describe different approaches and findings making it difficult to compare one with the other.

In the case of Flannery and Flannery (1990) it may be possible that the use of a varimax rotation, which keeps factors from correlating, resulted in the identification of 2 less significant factors beyond the main factor. The use of the varimax-promax approach in Frenz, Carey and Jorgensen (1993) allowed for orthogonal, followed by related factors which may explain their findings of 5 individual factors which were further analysed to produce a general factor. In brief it is difficult without several replications with homogenous samples to assess how much of the findings are due to the technique applied and how much to the data or the measure under assessment.

Flannery and Flannery (1990) reported no sex differences and used the mixed sex sample for the factor analysis. Frenz, Carey and Jorgensen (1993) used a mixed sex sample without reporting any separation of male and female findings. In this way any sex differences may have been missed. Any which did exist may have biased the

findings based on a mixed sex sample. For example questions such as the following may arguably be seen differently by men and women:

(22) You anticipate that your personal life in the future will be

1	2	3	4	5	6	7
Totally without meaning or purpose						Full of meaning and purpose

This measures Meaningfulness found to have sex differences which reached 99% certainty level before Bonferroni Correction in the previous study. After correction, however, this findings was not found to be significant and the need for a follow up study was suggested.

This type of question involves relationships which are commonly considered as a more important theme in womens' lives (Argyle, 1987). This suggests that answers to questions which include this element may be differenct for men and women.

The Flannery and Flannery (1990) study involved a group of 95 mature students completing further education, which is similar to, although smaller than, 2 of the groups used in the current study. They carried out principal components analysis with a varimax rotation and found 1 main factor which accounted for 36% of the variance and 2 minor factors which accounted for 7.5% and 5.3% of the variance respectively. As with the criticism of the factor analytic studies done with the hardiness measures the information provided did not meet Breakwell et al.s, (1995) recommendations for adequate interpretation and replication and Flannery and Flannery (1990) note that the sample is quite small for this statistical technique which may affect the accuracy of findings. In support of Antonovsky's (1987) claims, the dimensions were found to be highly intercorrelated, although this was not reported from the principal components analysis but from separate correlations. It would not have been possible to assess these correlations through the factor analysis as the items did not load distinctly on the three dimensions. No information is given on the items

included in the various factors making it less clear whether particular aspects of the dimensions factor out independently. It is possible therefore that one dimension is extremely well defined and accounts for much of the variance but this information is not available.

In the second study Frenz, Carey, and Jorgensen (1993) also used a mixed sample of 374. This is similar to the current study as they included several samples of students and social service employees although they combined all their samples together and did not collect normative data from the various samples. Data groups in the current study were kept separate as it was felt that normative information from a large number of independent samples should be gathered with the option combining these at a later date if so required.

The Frenz et al. (1993) research is the only published study in the area which provides adequate details of the principal components analysis. They report use of Kaiser's criterion (i.e. eigenvalues > 1) combined with examination of a screeplot in order to make the decision about which factors to extract. From this it was decided to retain 5 factors and a varimax-promax rotation was carried out on these. This rotation involves first an orthogonal rotation which keeps the factors independent and a later oblique rotation which allows the factors to correlate. As the factors appeared to be intercorrelated a further principal components analysis was carried out on the factor scores from the initial analysis and this produced 1 general factor. The separation of items into 5 factors involved only 13 of the 29 items which are reported below in table 6.3.

Table 6.3 Sense of Coherence Factors and Loadings (taken from Frenz, Carey & Jorgensen,1993)

Factor 1.Comprehensibility

8. Until now your life has had... (Meaningfulness)

1 2 3 4 5 6 7 Loading .62

no clear goals or or purpose — very clear goals and purpose

19. Do you have very mixed up feelings and ideas ? (Comprehensibility)

1 2 3 4 5 6 7 Loading .68

very often — very seldom or never

21. Does it happen that you have feelings inside you would rather not feel ? (Comprehensibility)

1 2 3 4 5 6 7 Loading .64

very often — very seldom or never

Factor 2.Life Interest

3. Think of people with whom you come into contact daily. aside from the ones to whom you feel closest, how well do you know most of them ? (Comprehensibility)

1 2 3 4 5 6 7 Loading .61

you feel that they're strangers — you know them very well

11. (R) Most of the things you will do in the future will probably be... (Meaningfulness)

1 2 3 4 5 6 7 Loading .61

completely fascinating — deadly boring

(continued on next page)

Table 6.3 (Continued) Sense of Coherence Factors and Loadings (taken from Frenz, Carey & Jorgensen,1993)

22. You anticipate that your personal life in the future will probably be...(Meaningfulness)

1	2	3	4	5	6	7	Loading .57
totally without meaning or purpose						full of meaning and purpose	

Factor 3: Self-Efficacy

13. (R) What best describes how you see life: (Manageability)

1	2	3	4	5	6	7	Loading .75
one can always find a solution to painful things in life						there is no solution to painful things in life	

18. When something unpleasant happened in the past year your tendency was.. (Manageability)

1	2	3	4	5	6	7	Loading .76
to eat yourself up about it				to say ok that's that I have to live with it and go on			

27. (R) When you think of difficulties you are likely to face in important aspects of your life do you have the feeling that: (Manageability)

1	2	3	4	5	6	7	Loading .57
you will always succeed in overcoming the difficulties						you won't succeed in overcoming the difficulties	

Factor 4: Interpersonal Trust

5. (R) Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well ? (Comprehensibility)

1	2	3	4	5	6	7	Loading .75
never happened						always happened	

6. Has it happened that people who you counted on disappointed you ? (Manageability)

1	2	3	4	5	6	7	Loading .78
never happened						always happened	

(continued on the next page)

Table 6.3 Sense of Coherence Factors and Loadings (taken from Frenz, Carey & Jorgensen,1993)

Factor 5. Predictability

10. In the past 10 years your life has been...							(Comprehensibility)
1	2	3	4	5	6	7	Loading .74
full of changes without your knowing what will happen next					completely consistent and clear		
17. Your life in the future will probably be ...					(Comprehensibility)		
1	2	3	4	5	6	7	Loading .84
full of changes without your knowing what will happen next					completely consistent and clear		

Note: R = reversed score items.

It is evident from table 6.3 that the individual items do not load consistently on the dimensions outlined by Antonovsky (1987). For instance factor 1 (Comprehensibility) includes an item from the Meaningfulness dimension (Q8) as outlined by Antonovsky. This suggests the need for further investigation of the model.

6.4.2 AREAS OF DIFFICULTY WITHIN THE FACTOR ANALYSIS OF SENSE OF COHERENCE

Problems which may have occurred in this study are that Frenz, Carey and Jorgensen (1993) appear to have created quite a heterogeneous sample which may lead to questionable applicability of results in specific samples. Although Antonovsky (1993) discusses the large amount of normative data which is already available these data sets have not been factor analysed and frequently use the questionnaire as opposed to evaluating it. Examination of screeplots (Cattell, 1966) and use of Kaiser's Criterion may have lead to over extraction of factors (Child,1970). It is reported that a level of >.55 was the level of factor loading selected to reduce cross loadings, however, this was an arbitrary choice. If, for example, the Burt-Banks Formula was applied (Burt, 1952) it is possible to decide upon the level of loading which reaches a chosen level of statistical significance according to the number of subjects and the order in which the loading appears in the extraction of factors. Through inspection of Frenz et al.s' (1993) results it would appear that, for example, item 3 which is considered to load on only factor 2, would also load on factor 5 according to the Burt-Banks Formula. Many more of the loadings would also be considered significant making the picture of the factor structure much less clear but perhaps more accurate. This possibility for different interpretation of findings is of course a function of the use of exploratory factor analysis.

In neither of the factor analytic studies reported above did the 3 dimensions of comprehensibility, manageability and meaningfulness emerge as separate factors

suggesting that the Sense of Coherence may indeed be a unitary construct. Antonovsky (1987) suggests that sense of coherence consists of 3 inextricably linked dimensions contributing to the general factor. They are inextricably linked as the facets (described in greater detail in chapter 2) are present across dimensions while manageability, meaningfulness and comprehensibility are present only in their individual dimension. This suggestion that the use of the chosen design approach (i.e.Guttman's Facet Theoretical design) will render the dimensions inseparable is difficult to refute as they may be inseparable due to the design or due to problems with the model. It is not possible to assess how much covariance the facets will account for. Through CFA it is possible to test the model of one general factor, with three contributory but interrelated factors and whether the items designated to each dimension do indeed load on those dimensions.

It was also considered by Antonovsky (p86, 1987) that a person may have high scores on one dimension while still having low scores on another. As with the hardiness composite score this appears to be misleading if a person scores highly in one area and thus has a high score overall they may still have an area of difficulty. For example someone may feel that they understand their life (comprehensibility), feel it is meaningful to them but do not feel they can cope with it (manageability).

6.4.3 UNPUBLISHED FACTOR ANALYTIC STUDIES OF SENSE OF COHERENCE

As there are so few published studies which have used principal components analysis unpublished studies are also mentioned in table 6.2. One main factor is reported in three studies using students (Holme, Ehde, Lamberty, Dix & Thompson, 1988, a poster cited in Frenz et al., 1993; Pottie,1990 (unpublished), cited in Antonovsky, 1993; and Dana, Hoffman, Armstrong & Wilson, 1985, a poster cited in Antonovsky, 1993;). The internal relationships of the separate dimensions are not reported in any instance.

6.4.4 CLINICAL USE OF SENSE OF COHERENCE AS 3 SEPARATE DIMENSIONS

In at least one published study (Petrie & Brook, 1992) psychiatrists in New Zealand used the dimensions separately to assess predictive validity for reattempting suicide in psychiatric patients. If these dimensions are not valid and reliable but are being considered as such by the clinical community this has obvious dangers. There is no evidence that these dimensions can operate separately or that they are independent but related factors. Indeed different factors may dominate for different individuals in different situations. This lack of attention to the factor structure and measurement of the construct is pinpointed as a weakness in the measure (Frenz, Carey & Jorgensen, 1993).

The models which have been suggested by the literature and research on sense of coherence were tested in the current study using confirmatory factor analysis.

6.4.5 CONTRIBUTION OF DESIGN OF SENSE OF COHERENCE TO FACTOR STRUCTURE

As Antonovsky believed sense of coherence to refer to a global orientation to life and not a response to a one off situation, he aimed to measure selected aspects of life from inside / outside the person, from the past / present / future etc. These were reflected in his choice of facets outlined below. He aimed to make each word of each item specific and in no way ambiguous in order to ensure validity. Every item is constructed to include each facet and one of the dimensions of comprehensibility, manageability and meaningfulness. Literature is consulted and a research group review the questions until agreement is reached.

Facets

Modality: The person responds to a stimulus which is either instrumental, cognitive or affective in mode.

Source: This stimulus has originated from an environment which is either external, internal or both.

Demand: The demand posed on the person is either concrete, diffuse or abstract.

Time: This stimulus refers to the need for a response from either what the person has done in the past, is doing in the present or will do in the future.

For example;

(25) Many people even those with a strong character sometimes feel like sad sacks in certain situations. How often have you felt this way in the past ?

This question is from the dimension of Manageability, with affective "**modality**", from the internal "**source**" environment, which poses an "**abstract**" demand about the past **"time"**.

6.5 CONFIRMATORY FACTOR ANALYSIS

Confirmatory factor analysis is primarily a method of data reduction used to examine the underlying constructs of a group of questions, i.e. what the common themes are about which they are asking (Cole, 1987). In contrast with exploratory factor analysis, confirmatory factor analysis controls which items load on which factors and also the degree of factor and error orthogonality. Thus the researcher defines the factors beforehand and does not, as in the previous studies reported in the literature, examine what emerges and make interpretations. Furthermore with the confirmatory approach it is possible to compare statistically the fit of various models and using the Wald and Lagrange Multiplier Tests, to make recommendations for

which parameters might be added or dropped in order to increase model validity. In this way the possibility of more accurately assessing the measures which offer the possibility of prophylactic care discussed at the beginning of this work may be a step nearer.

6.6 WHEN TO USE FACTOR ANALYSIS

It is possible to use most kinds of distributions providing they are not; excessively skewed, truncated, bimodal or based on a curvilinear relationship (Child, 1970). Distributions for the current section can be found in appendices , IX, XI and XII. The correlations are based on the assumption that the relationship between the items in the analysis is linear. It is generally expected that there must be around three times as many subjects as variables in the analysis.

6.7 SUBJECTS

Three samples were used in the current study. These consisted of 174 women from the open university student group discussed in study 3.The mean age of the sample was 33.82 years (SD = 10.22). Two male samples were also used. These were 108 open university males which included a new sample added to those in study 3 in order to provide adequate numbers for factor analysis. The mean age of the sample was 31.73 years (SD = 11.19). Finally a sample of 156 employed males in Aberdeen including for example social services staff, general practitioners, engineers, catering staff, security workers, health and fitness instructors, police. The criteria for inclusion were that the subject was employed, male and working in Aberdeen and over 18 years of age. The mean age of the sample was 37.36 (SD = 9.92).

It is considered that there should always be more subjects than variables and if possible there should be three subjects for each variable. Due to the findings

concerning sex differences in study 3 it was felt that male and female subjects should be analysed separately.

6.8 METHOD

A battery of four questionnaires was given in random order and administered to each group; Sense of Coherence Questionnaire (Antonovsky, 1987), Dispositional Resilience Scale (Bartone,Ursano,Wright & Ingraham,1989), Eysenck Personality Inventory (Eysenck & Eysenck, 1964), and the General Health Questionnaire, 12-question version (Goldberg & Williams,1988). In the group of male subjects in Aberdeen it was not possible to gather all subjects together therefore a stamped addressed envelope was provided for return of the battery which they completed in their own time. This increased length of time to complete the measures and opportunity to discuss them, may have influenced answer patterns and may have lead to a mor e highly motivated group of subjects. As the alternative to providing envelopes to take away was to loose a large number of the subjects, use of a postal return was considered necessary to obtain the number of subjects necessary for factor analysis.

6.9 RESULTS

Confirmatory factor analysis using the maximum likelihood approach was performed separately on the variance-covariance matrix of the Dispositional Resilience Scale and the Sense of Coherence Questionnaire items using EQS for Windows Version 5.1 (Bentler, 1989). The aim of the maximum likelihood approach in confirmatory factor analysis is to find the factor solution which, from the empirical models in the literature, best fits the observed correlations in the sample data (Kim & Mueller, 1978). The parameterisation (i.e. factor structure) of each of the models

discussed in the literature were tested for goodness of fit in comparison with the models outlined by the authors (Bartone et al., 1989; Antonovsky, 1987). Fit was assessed using Chi-square, the average off-diagonal standardised residual and the Comparative Fit Index (CFI) (Bentler, 1989).

The Chi-square statistic refers to the independence Chi-square reported for the Bentler and Bonnet (1980) null model which in larger samples serves as a good baseline against which to compare the fit of alternative models (Byrne, 1994). The better the fit of the hypothesised model the higher the Chi-square would be expected to be, indicating a bad fit of the null model. A significant Chi-square suggests that the covariance between items on the questionnaire and factors, is not explained by the model and that it is therefore a poor fit.

The off-diagonal standardised residual reflects the extent to which covariances between manifest variables, in this case the items in the questionnaires, are not accounted for by the hypothesised model. In a good model most residual values would fall between - .1 - +.1 (Byrne, 1994). Finally the CFI is a reworked version of the Normed Fit Index which was shown to underestimate fit in smaller samples (Bentler, 1990). Unlike its predecessor Comparative Fit Index takes sample size into account. Derived from comparison of the hypothesised model with the null model it ranges from 0 - 1 and a value > .9 indicates an acceptable model (Bentler, 1989).

The Sense of Coherence model which proposes 3 interrelated factors which contribute to one general factor (Antonovsky, 1987) was tested out in relation to 4 nested variants. The model of hardiness proposed by Bartone et al. (1989) also suggests 3 interrelated factors which contribute to one general factor and this was tested in relation to 4 nested variants. The hypothesised models were considered to be nested within the originals as they varied from them only in imposing further constraints on the relationship between the original variables.

The Chi-square values for the nested models were compared with those of the original less constrained models for goodness of fit.

Each subject group was analysed separately enabling examination of any sex differences. The CFI for the models which proposed 3 related factor and one general factor for both sense of coherence and hardiness were found to be the highest in each group; Aberdeen male group, Open University male group and Open University female group were .871, .853, .851 respectively and were not found to be significantly different.

A graphical representation of the factor analytic model which fit most closely across the 3 groups for both the Sense of Coherence Questionnaire (Aberdeen male group) and Dispositional Resilience Scale (Open University female group) are described in figures 6.1 in figure 6.2 respectively. In both cases the best fit models are those recommended by the authors, however, in neither instance is the CFI cut-off point of .9 reached. The significance level of the Chi-square for both the sense of coherence and hardiness models is $p < .001$ suggesting that the chances of obtaining the models is 1 in 100 and therefore highly unlikely.

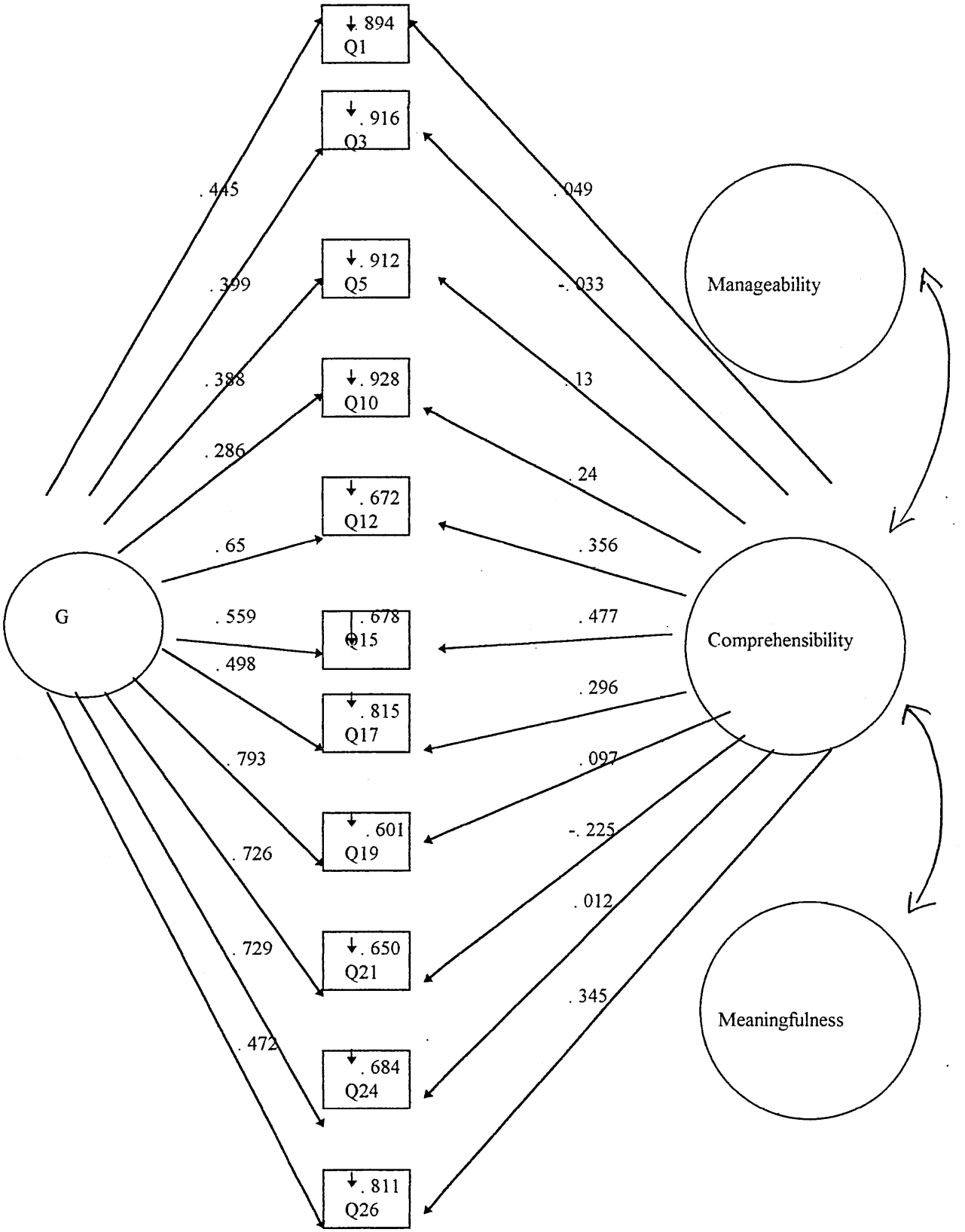


Figure 6.1Part 1. Loadings of Comprehensibility and the General Sense of Coherence Factor on the Items Considered by Antonovsky (1987) to Comprise the Dimension of Comprehensibility. Details and key on the following page.

Graphical representation of a confirmatory factor analytic model in which the Sense of Coherence Questionnaire simultaneously has three related factors; Comprehensibility, Manageability and Meaningfulness and one general factor. Due to the number of items in the scale (manifest variables) it was not possible to represent this on one page. The factor loadings of Comprehensibility, Manageability and Meaningfulness on their respective items are therefore presented separately over 3 pages.

Part 1 represents the loadings of Comprehensibility, part 2 represents the loadings of Manageability and part 3 represents the loadings of Meaningfulness on the manifest variables. The details of the loadings of the general factor on the items which constitute each separate dimension are present in each part of the figure.

The latent variables are represented as circles; G = general. The manifest variables are represented as squares. The numbers above each arrow pointing from the latent variables to the manifest variables represent the standardised loadings of each manifest variable on its respective latent variable. Each manifest variable also has an error component; these are presented alongside the arrows which appear above each manifest variable.

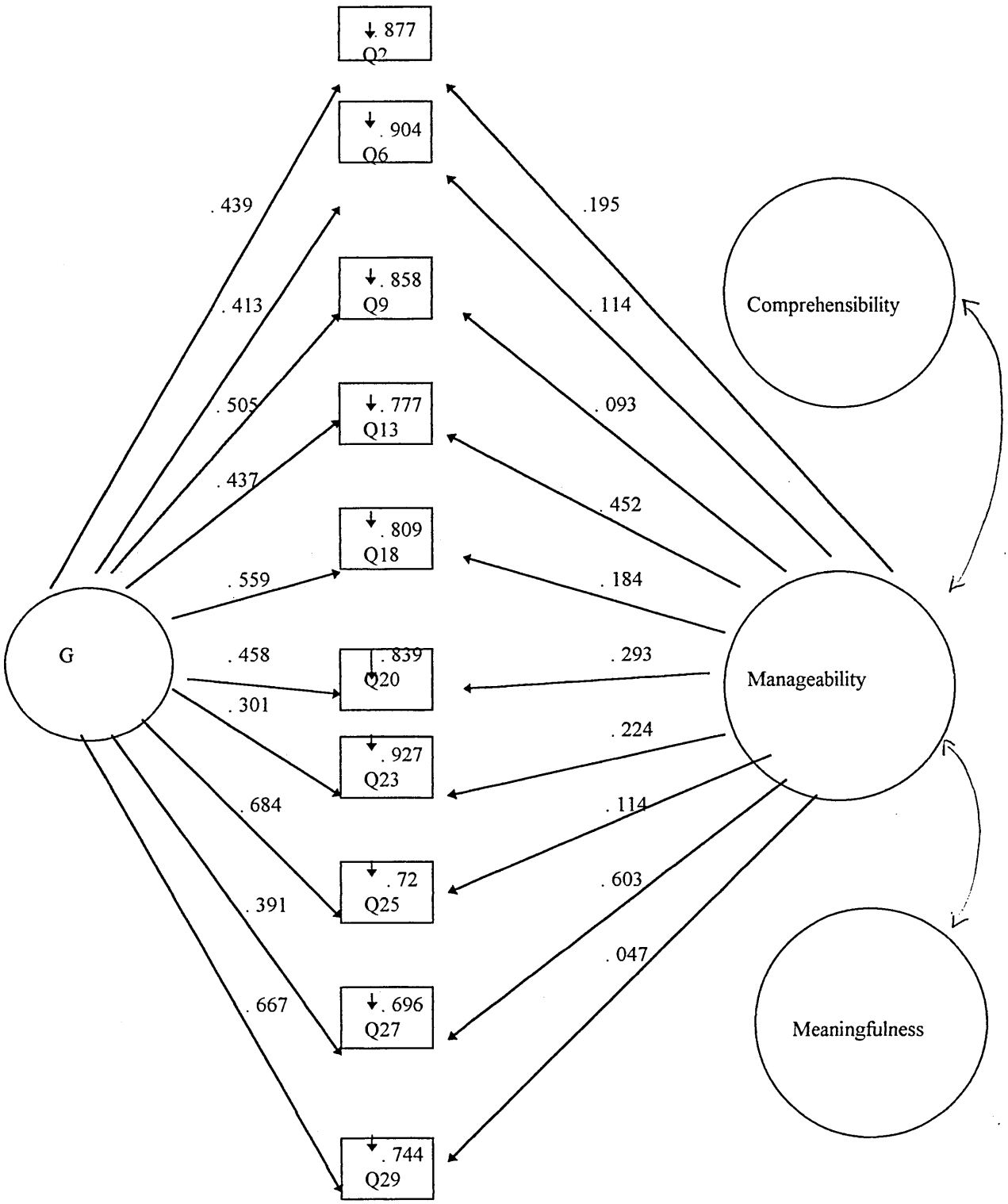


Figure 6.1Part 2. Loadings of Manageability and the General Sense of Coherence Factor on the Items Considered by Antonovsky (1987) to Comprise the Dimension of Manageability. Details and key on page 201.

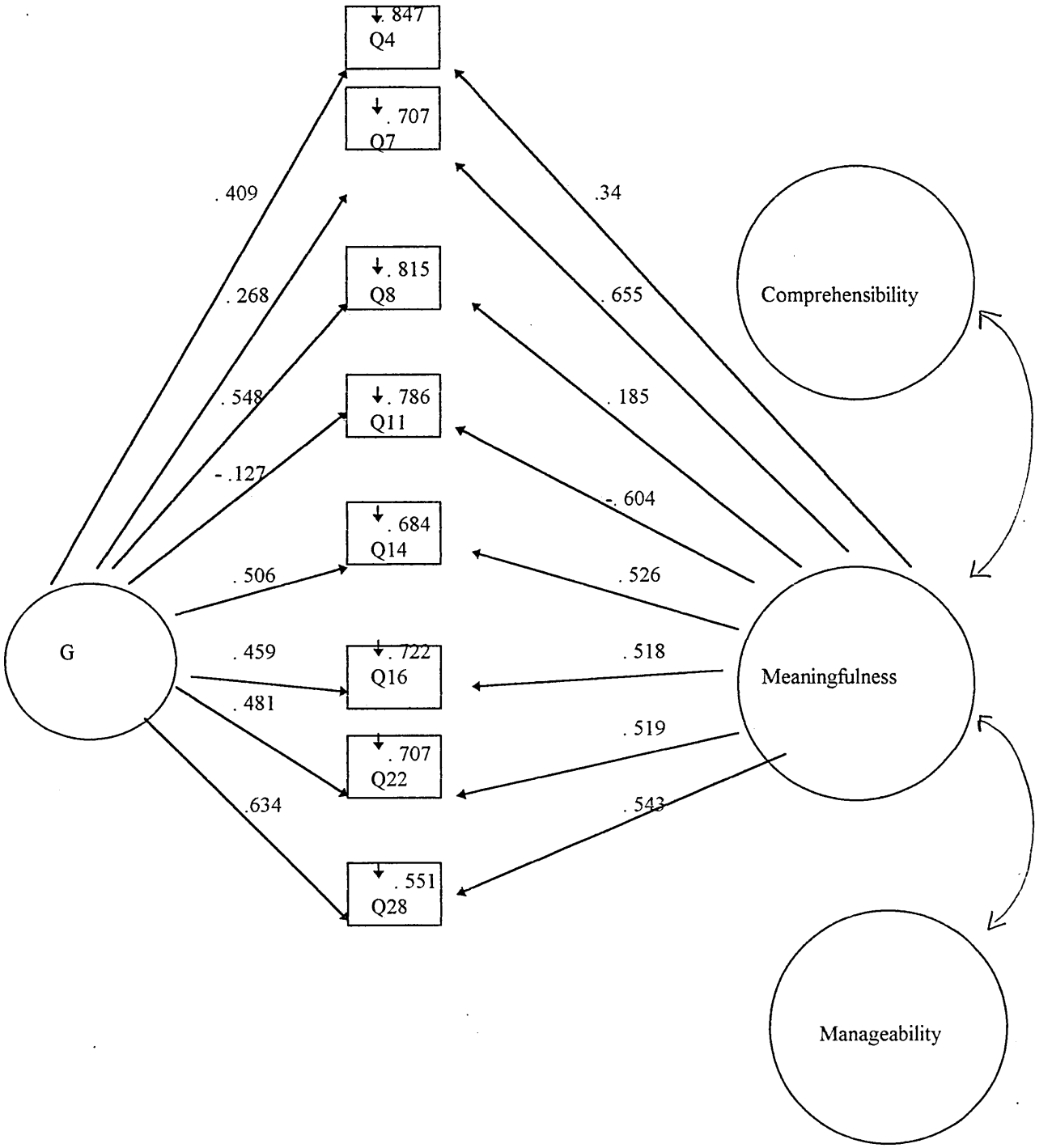


Figure 6.1Part 3. Loadings of Meaningfulness and the General Sense of Coherence Factor on the Items Considered by Antonovsky (1987) to Comprise the Dimension of Meaningfulness. Details and key on page 201.

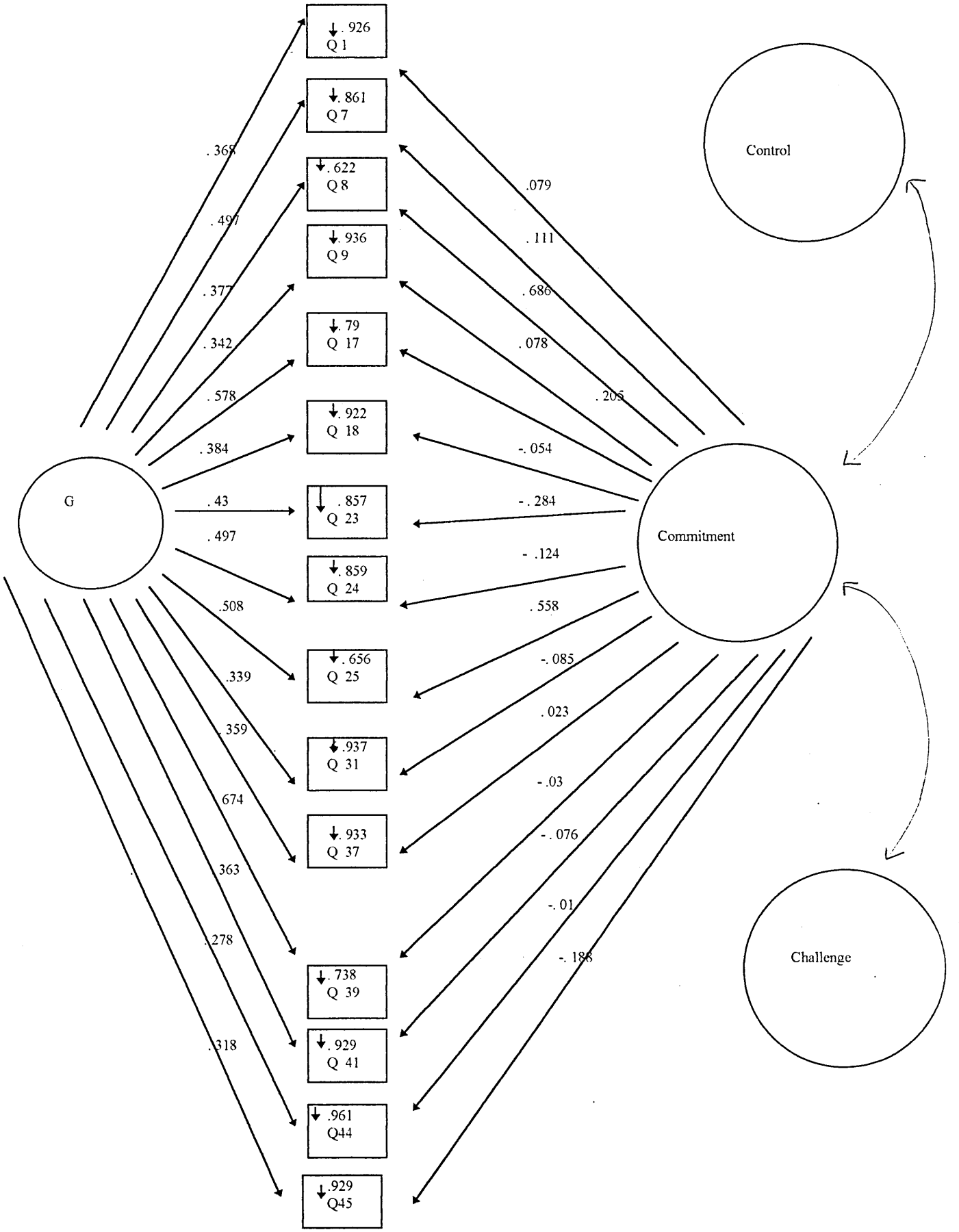


Figure 6.2 Part 1. Loadings of Commitment and the General Hardiness Factor on the Items Considered by Bartone et al. (1989) to Comprise the Dimension of Commitment. Details and key on the following page.

Figure 6.2 Part 1. Loadings of Commitment and the General Hardiness Factor on the Items Considered by Bartone et al. (1989) to Comprise the Dimension of Commitment. Details and key on the following page.

Graphical representation of a confirmatory factor analytic model in which the Dispositional Resilience Scale simultaneously has three related factors; Commitment, Control and Challenge and one general factor. Due to the number of items in the scale (manifest variables) it was not possible to represent this on one page. The factor loadings of Commitment, Control and Challenge on their respective items are therefore presented separately over 3 pages.

Part 1 represents the loadings of Commitment, part 2 represents the loadings of Control and part 3 represents the loadings of Challenge on the manifest variables. The details of the loadings of the general factor on the items which constitute each separate dimension are present in each part of the figure.

The latent variables are represented as circles; G = general. The manifest variables are represented as squares. The numbers above each arrow pointing from the latent variables to the manifest variables represent the standardised loadings of each manifest variable on its respective latent variable. Each manifest variable also has an error component; these are presented alongside the arrows which appear above each manifest variable.

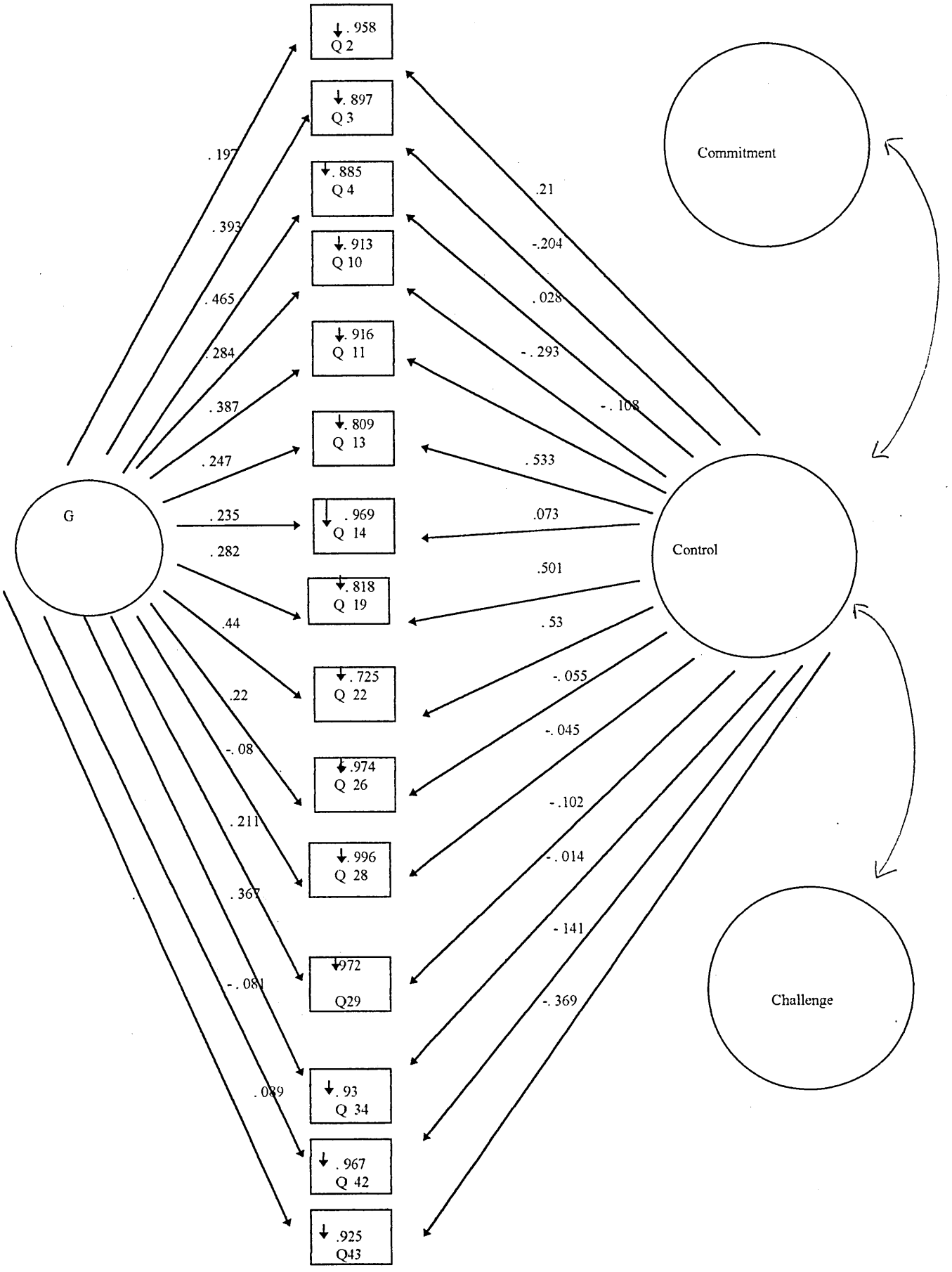


Figure 6.2 Part 2. Loadings of Control and the General Hardiness Factor on the Items Considered by Bartone et al. (1989) to Comprise the Dimension of Control. Details and key on page 205.

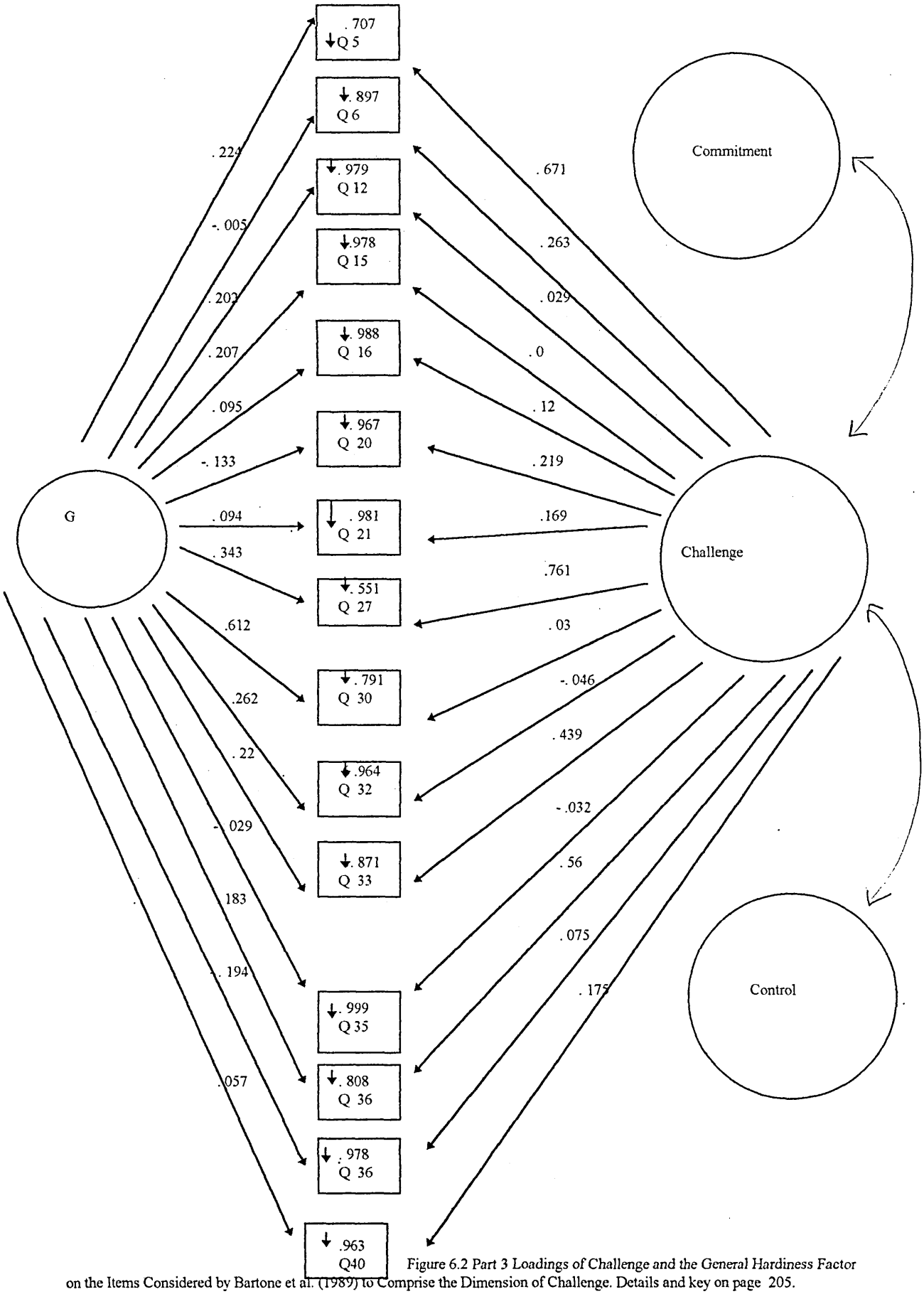


Figure 6.2 Part 3 Loadings of Challenge and the General Hardiness Factor on the Items Considered by Bartone et al. (1989) to Comprise the Dimension of Challenge. Details and key on page 205.

Figure 6.2 Part 3 Loadings of Challenge and the General Hardiness Factor on the Items Considered by Bartone et al. (1989) to Comprise the Dimension of Challenge. Details and key on page 218.

Fit indices for the 12 confirmatory factor analytic models proposed for the Sense of Coherence Questionnaire and the Dispositional Resilience Scale in the introduction are reported for each sample in tables 6.4 and 6.5. Where the parameters of the model were outwith the available sample the EQS programme was not able to produce results. The Sense of Coherence Questionnaire 3 interrelated factors with 1 general factor model was the closest to the cut-off point of .9 suggesting that modifications might improve this model to a workable standard. The hardiness model of 3 interrelated factors with 1 general factor, using the Dispositional Resilience Scale, however, appeared grossly inaccurate in its present form.

Table 6.4: Fit Indices for Dispositional Resilience Scale Confirmatory Factor Analytic Models for Open University Male and Female Groups, and Employed Aberdeen Male Group

Model	Chi-square	df	CFI	AODSR
(Aberdeen Male Group N =156)				
(1)Hardiness as 3 orthogonal factors with 1 general factor of hardiness	1616.978	909	.512	.093
(2) Hardiness as 3 related factors	1777.249	942	.425	.083
(3) Hardiness as 3 orthogonal factors	1899.899	945	.342	.105
(4)Hardiness as 3 interrelated factors + general factor of hardiness	Inaccurate model - no fit available			
(5) Hardiness as 1 factor	1859.9	945	.37	.084
(Open University Male Group N = 108)				
(1) Hardiness as 3 interrelated factors with 1 general factor of hardiness	1424.738	897	.64	.074
(2) Hardiness as 3 interrelated factors	1646.771	942	.52	.094
(3) Hardiness as 3 orthogonal factors	1741.997	945	.457	.135
(4) Hardiness as 3 orthogonal factors with 1 general factor of hardiness	1477.874	900	.606	.079
(5) Hardiness as 1 factor	1712.053	945	.477	.087
(Open University Female Group N= 180)				
(1) Hardiness as 3 interrelated factors with 1 general factor of hardiness	1379.249	897	.645	.065
(2) Hardiness as 3 interrelated factors	1626.437	942	.496	.076
(3) Hardiness as 3 orthogonal factors	1723.677	945	.427	.096
(4) Hardiness as 3 orthogonal factors with 1 general factor of hardiness	1396.843	900	.634	.067
(5) Hardiness as 1 factor	1723.639	945	.427	.075

Note: CFI = Comparative Fit Index ; AODSR = Average off diagonal standardised residual ; df = degrees of freedom. The numbers at the beginning of each line refer to model .

Table 6.5: Fit Indices for Sense of Coherence Questionnaire Confirmatory Factor Analytic Models for Open University Male and Female Groups, and Employed Aberdeen Male Group

Model	Chi-square	df	CFI	AODSR
(Aberdeen Male Group N = 156)				
(1) SOC as 3 interrelated factors with 1 general factor of SOC	564.435	345	.871	.048
(2) SOC as 3 related factors	689.524	374	.815	.062
(3) SOC as 3 orthogonal factors	925.365	377	.678	.197
(4) SOC as 3 orthogonal factors with 1 general factor of SOC	712.384	351	.788	.09
(5) SOC as 1 factor	852.478	377	.721	.07
(Open University Male Group N= 108)				
(1) SOC as 3 interrelated factors with 1 general factor of SOC	576.674	345	.853	.05
(2) SOC as 3 related factors	708.139	374	.788	.069
(3) SOC as 3 orthogonal factors	913.621	377	.66	.226
(4) SOC as 3 orthogonal factors with 1 general factor of SOC	630.576	348	.821	.064
(5) SOC as 1 factor	849.49	377	.701	.078
(Open University Female Group N = 180)				
(1) SOC as 3 interrelated factors with 1 general factor of SOC	564.752	345	.851	.05
(2) SOC as 3 related factors	783.518	374	.723	.057
(3) SOC as 3 orthogonal factors	1045.563	377	.427	.096
(4) SOC as 3 orthogonal factors with 1 general factor of SOC	Inaccurate model - no fit available			
(5) SOC as 1 factor	847.114	377	.682	.065

Note: CFI = Comparative Fit Index ; AODSR = Average off diagonal standardised residual ; df = degrees of freedom. The numbers at the beginning of each line refer to model . SOC = Sense of Coherence.

In tables 6.6 and 6.7 the fit of the least constrained models presented in figures 6.4 and 6.5 was compared with the fit of the more constrained models. The less constrained models are those where the variables are able to load on a larger number of factors i.e. they are not as constrained as those which for example must load on a single factor, the most constrained model possible. The fit of the models was compared using the Chi-square difference test in which it is assessed whether the model with less constraints has a better fit despite the loss of degrees of freedom which occurs through reducing the constraints. In the Sense of Coherence Questionnaire and the Dispositional Resilience Scale the model of 3 interrelated factors with 1 general factor was significantly better than all other models. This is shown by the significant difference between them reported below.

Table 6.6 Comparison of Model Fit For the Nested CFA Models For Sense of Coherence

Aberdeen Male Group

Comparison	Chi-Square	df	P
Model 1 vs Model 2	125	29	< .000009
Model 1 vs Model 3	360.93	32	< 1
Model 1 vs Model 4	147.95	6	< .000009
Model 1 vs Model 5	288.05	32	< 1

Note: P< 1 occurs when the program cannot produce the digits for such a high level of significance.

Open University Male Group

Comparison	Chi-Square	df	P
Model 1 vs Model 2	131.47	29	< .000009
Model 1 vs Model 3	336.95	32	< 1
Model 1 vs Model 4	53.31	3	< .000009
Model 1 vs Model 5	Program could not calculate this due to the large discrepancy between the models	******	****

Note: P< 1 occurs when the program cannot produce the digits for such a high level of significance.

Female Group

Comparison	Chi-Square	df	P
Model 1 vs Model 2	218.77	29	< .000009
Model 1 vs Model 3	480.81	32	< 1
Model 1 vs Model 4	Model 4 - could not be calculated by CFA due to extent of poor fit		
Model 1 vs Model 5	282.36	32	< 1

Note: P< 1 occurs when the program cannot produce the digits for such a high level of significance.

Table 6.7 Comparison of Model Fit For the Nested CFA Models For Dispositional Resilience Scale

Aberdeen Male Group

Comparison	Chi-Square	df	P
Model 1 vs Model 2	160.272	33	< .000009
Model 1 vs Model 3	283	36	<1
Model 1 vs Model 4	Model 4 - could not be calculated by CFA due to extent of poor fit		
Model 1 vs Model 5	242.92	36	< .000009

Note: P< 1 occurs when the program cannot produce the digits for such a high level of significance.

Open University Male Group

Comparison	Chi-Square	df	P
Model 1 vs Model 2	222.03	45	< .000009
Model 1 vs Model 3	317.26	48	< 1
Model 1 vs Model 4	53.13	3	< .000009
Model 1 vs Model 5	287.31	48	< .000009

Note: P< 1 occurs when the program cannot produce the digits for such a high level of significance.

Female Group

Comparison	Chi-Square	df	P
Model 1 vs Model 2	247.19	45	< .000009
Model 1 vs Model 3	344.43	48	< 1
Model 1 vs Model 4	17.59	3	<.0005
Model 1 vs Model 5	344.39	48	< 1

Note: P< 1 occurs when the program cannot produce the digits for such a high level of significance.

As no model was found accurate enough to meet the criteria set out by Bentler (1989) it was not possible to include scores on neuroticism and the General Health Questionnaire in a confirmatory factor analysis to assess the contribution of what they measure to the model. Kendall's Correlations continued to reveal a strong negative relationship between Neuroticism, and scores on the General Health Questionnaire, the Dispositional Resilience and the Sense of Coherence Questionnaire and these are reported in tables 6.8 - 6.10.

Table 6.8 Kendall's Correlations of the Hardiness Total Score, Sense of Coherence, General Health Questionnaire, Neuroticism and Extroversion, Open University Male Group (N = 108).

	GENERAL HEALTH QU'RE	NEUROTICISM	EXTROVERSION	SENSE OF COHERENCE
NEUROTICISM	Tau = .3 ***			
EXTROVERSION	Tau = -.17 **	Tau = -.12 *		
SENSE OF COHERENCE	Tau = - .38 ***	Tau = - .44 ***	Tau = .18 **	
HARDINESS	Tau = -. 22 ***	Tau = - .18 **	Tau = - .02	Tau = .31 ***

Note:* p<.05. **p<.01. ***p<.001

Table 6.9 Kendall's Correlations of the Hardiness Total Score, Sense of Coherence, General Health Questionnaire, Neuroticism and Extroversion, Aberdeen Male Group, (N = 156).

	GENERAL HEALTH QU'RE	NEUROTICISM	EXTROVERSION	SENSE OF COHERENCE
NEUROTICISM	Tau = .39 ***			
EXTROVERSION	Tau = -.01	Tau = .0		
SENSE OF COHERENCE	Tau = - .3 ***	Tau = - .47 ***	Tau = .07	
HARDINESS	Tau = -. 11 *	Tau = - .26 ***	Tau = .06	Tau = .39 ***

Note:* p<.05. **p<.01. ***p<.001

Table 6.10 Kendall's Correlations of the Hardiness Total Score, Sense of Coherence, General Health Questionnaire, Neuroticism and Extroversion, Open University Female Group, (N = 180).

	GENERAL HEALTH QU'RE	NEUROTICISM	EXTROVERSION	SENSE OF COHERENCE
NEUROTICISM	Tau = .41 ***			
EXTROVERSION	Tau = -.1 **	Tau = -.14 ***		
SENSE OF COHERENCE	Tau = - .37 ***	Tau = - .48 ***	Tau = .19 ***	
HARDINESS	Tau = -. 23 ***	Tau = - .38 ***	Tau = .15 ***	Tau = .42 ***

Note:* p<.05. **p<.01. ***p<.001

6.7.1 Suggested Parameter Changes in Hardiness Model

A Wald Test which assesses whether there are any parameters which could be removed in order to improve the model and a Lagrange Multiplier(LM) Test which assesses whether any parameters might be added in order to improve the model, were both carried out on the best fit model for each measure as part of the EQS programme (Bentler, 1989). It is suggested that the multivariate LM Test may be the more accurate to base changes to the model upon as the univariate statistics test parameters individually without taking into account the interrelationships between variables (Byrne, 1994). This may lead to an increase in significant results and a loss of sensitivity.

These findings may be used to implement post hoc changes to the hypothesised models, however, Byrne (1994) advises careful consideration of the rationale before making changes. She emphasises the need to provide a coherent

argument for changes from both the background knowledge and the statistical findings and not to base changes on the statistical findings alone.

A Wald Test for dropping parameters was carried out on the hypothesised model for hardiness (i.e. three inter-related factors and one general factor) based on the scores from the Open University female group and the Open University male group (Details are available in appendix XIII). The Aberdeen male group results were not available due to the inaccurate fit of the model. The next best fitting model had a CFI of .51 making it an extremely bad fit and comparison of suggested changes in the 2 different models would be meaningless. A Lagrange Multiplier Test for adding parameters was also carried out on these data. The main findings are reported in tables 6.11-6.13 below.

Table 6.11: Suggested Parameter ChangesFor Control From the Wald Test and Lagrange Multiplier Test Using the Open University Male and Female Groups

Group	Item (Original Dimension)	Would improve fit of model if did not load on "X"	Would improve model if did load on "X"
OUM F	3. Trying hard doesn't pay as things still don't turn out right (R)	OUM- General factor F - Control	LM Test did not suggest an alternative
OUM	10. Most of what happens in life is just meant to be (R)	General factor or Control	LM Test did not suggest an alternative
OUM F	11. It's usually impossible for me to change things at work (R)	OUM-General factor F- Control	LM Test did not suggest an alternative
OUM F	14. It's very hard for me to change a friends mind about something (R)	OUM- General factor F - Control	LM Test did not suggest an alternative
OUM F	26. My mistakes are usually very difficult to correct (R)	OUM-General factor F - Control	OUM-LM Test did not suggest an alternative F - Commitment
OUM F	29. Most good athletes and leaders are born not made (R)	OUM- General factor OUM&F Control	LM Test did not suggest an alternative
OUM F	34. I can't do much to prevent it if someone wants to harm me (R)	OUM - General factor OUM&F - Control	LM Test did not suggest an alternative
F	42. What happens to me tomorrow depends on what I do today	General factor or Control	Commitment
OUM	2. Planning ahead can help avoid most future problems	Control	Challenge
F	4. No matter how hard I try my efforts usually accomplish nothing	Control (R)	LM Test did not suggest an alternative
OUM	13. When I make plans I am certain I can make them work	Control	LM Test did not suggest an alternative
OUM	19. If I am working on a difficult task I know when to seek help	Control	LM Test did not suggest an alternative
F	28. It's best to handle most problems by just not thinking of them (R)	Control	LM Test did not suggest an alternative
OUM	42. What happens to me tomorrow depends on what I do today	Control	LM Test did not suggest an alternative

Note: OUM = Open University Male Group; F = Open University Female Group; R = reverse scored; Scoring 0 - 3 ; 0 = Not at all true to 3 = Completely true.

Table 6.12 Suggested Parameter ChangesFor Commitment From the Wald Test and Lagrange Multiplier Test Using the Open University Male and Female Groups

Group	Item (Original Dimension)	Would improve fit of model if did not load on "X"	Would improve model if did load on "X"
OUM F	7. Working hard doesn't matter since only the bosses profit from it (R)	OUM-General factor OUM&F - Commitment	F-Control LM Test did not suggest an alternative
OUM F	9. Most working people are simply manipulated by their bosses (R)	OUM -General factor OUM& F - Commitment	LM Test did not suggest an alternative
OUM F	18.Politicians run out lives (R)	OUM -General factor F -Commitment	LM Test did not suggest an alternative
OUM F	31. Lots of times I don't really know my own mind (R)	OUM - General factor OUM&F Commitment	LM Test did not suggest an alternative
OUM F	37. People who believe in individuality are kidding themselves (R)	OUM - General factor OUM&F - Commitment	OUM - LM Test did not suggest an alternative F - Control
OUM F	41. Its hard to imagine anyone getting excited about working (R)	OUM - General factor OUM&F - Commitment	LM Test did not suggest an alternative
OUM F	44. It's hard to believe people who say their work helps society	OUM - General factor OUM&F - Commitment	OUM - LMTest did not suggest an alternative -F - Control
F	45. Ordinary work is just too boring to be worth doing (R)	General factor or Commitment	LM Test did not suggest an alternative
F	1..Most of my life gets spent doing things that are worthwhile	Commitment	Control
F	24.Thinking of yourself as a free just leads to frustration (R)	Commitment	LM Test did not suggest an alternative
F	39. Most days life is really interesting and exciting for me	Commitment	Control

Note: OUM = Open University Male Group; F = Open University Female Group; R = reverse scored; Scoring 0 - 3 ; 0 = Not at all true to 3 = Completely true.

Table 6.13 Suggested Parameter ChangesFor Challenge From the Wald Test and Lagrange Multiplier Test Using the Open University Male and Female Groups

Group	Item (Original Dimension)	Would improve fit of model if did not load on "X"	Would improve model if did load on "X"
OUM	5. I don't like to make changes in my everyday schedule (R)	General factor or Challenge	LM Test did not suggest an alternative
F	6. The tried and true ways are always best (R)	General factor or Challenge	Commitment
OUM F	12. New laws should never hurt a person's pay-check (R)	OUM -General factor OUM & F -Challenge	OUM -Commitment F- Control
F	16. People who never change their minds always have good judgement (R)	General factor or Challenge	LM Test did not suggest an alternative
OUM F	20. I won't answer a question until I am really sure I understand it (R)	General factor or Challenge	OUM -LM Test did not suggest an alternative F - Control
OUM F	21. I like a lot of variety in my work	General factor or Challenge	OUM -LM Test did not suggest an alternative F - Control
OUM	27. It bother me when my daily routine gets interrupted (R)	General factor or Challenge	LM Test did not suggest an alternative
F	32. I respect rules because they guide me (R))	General factor or Challenge	LM Test did not suggest an alternative
OUM	33. I like it when things are uncertain or unpredictable	General factor or Challenge	Control
OUM F	35. People who do their best should get full support from society (R)	General factor or Challenge	OUM-LM Test did not suggest an alternative F - Control
OUM	36. Changes in routine are interesting to me	General factor or Challenge	LM Test did not suggest an alternative
OUM F	38. I have no use for theories that are not closely tied to facts (CH)	OUM -General factor or Challenge F - Challenge	LM Test did not suggest an alternative

Note: OUM = Open University Male Group; F = Open University Female Group; R = reverse scored; Scoring 0 - 3 ; 0 = Not at all true to 3 = Completely true.

(continues on next page)

Table 6.13 Suggested Parameter ChangesFor Challenge From the Wald Test and Lagrange Multiplier Test Using the Open University Male and Female Groups

Group	Item (Original Dimension)	Would improve fit of model if did not load on "X"	Would improve model if did load on "X"
OUM F	40. I want to be sure someone will take care of me when I'm old (R)	F - General factor OUM&F - Challenge	OUM-LM Test did not suggest an alternative F - Commitment, & Control
OUM F	15. It's exciting to learn something about myself	Challenge	OUM-LM Test did not suggest an alternative F - Control
OUM F	30. I often wake up eager to take up life wherever it left off	Challenge	OUM - LM Test did not suggest an alternative

Note: OUM = Open University Male Group; F = Open University Female Group; R = reverse scored; Scoring 0 - 3 ; 0 = Not at all true to 3 = Completely true.

These findings suggest that there are several items which do not load on their dimension or on the general factor. It is possible that these items may be indicative of another factor however there is no evidence to support this from these data and this would need further investigation. If the general factor is considered to be hardiness then these items which do not load on it may be extraneous to the model. It is also evident that many items are not loaded on their dimension and may share variance with another dimension. In particular it is suggested that the majority of the Challenge items mentioned above would improve the model by loading on Control instead of Challenge. Furthermore it is suggested that the model would be improved if Challenge did not correlate with Control and Commitment.

Overall this supports the poor fit for the current hypothesised model of 3 interrelated factors with 1 general factor and that there may be at least 1 other unidentified factor contributing to the model.

The findings for the female group are not reflected in the data from the male Open University group, suggesting either sex differences, some other group difference or lack of reliability in the measure.

In the male open university group results suggest that a large number of items from each dimension would improve the model if they did not load on the general factor. Again this may be indicative of another unidentified factor, there may be many items which do not contribute to the hardiness construct but which do not necessarily covary or there may be an element of both of these issues influencing findings.

6.7.2 Suggested Parameter Changes in Sense of Coherence Model

A Wald Test for dropping parameters was carried out on the hypothesised model for sense of coherence (i.e. three inter-related factors plus one general factor) for each of the 3 subject groups A Lagrange Multiplier Test for adding parameters was also carried out on these data. The main findings are reported in tables 6.14-6.16 below. (The statistics are available in appendix XIII).

Table 6.14: Suggetsed Parameter Changes For Comprehensibility From the Wald Test and Lagrange Multiplier Test Using All Subject Groups

Group	Item (Original Dimension)	Would improve fit of model if did not load on "X"	Would improve model if did load on "X"
F	10. In the past 10 years your life has been Full of changes without your knowing what will happen next (score 1) Completely consistent and clear (score 7)	General factor	LM Test did not suggest an alternative
F	17. Your life in the future will probably be Full of changes without your knowing what will happen next (score 1) Completely consistent and clear (score 7)	General factor	LM Test did not suggest an alternative
F ABM OUM	1. When you talk to people do you have the feeling that they don't understand you ? Never have this feeling (score 1) Always have this feeling (score 7) (R)	Comprehensibility	LM Test did not suggest an alternative
F ABM OUM	3. Think of the people with whom you come into contact daily, aside from the ones to whom you feel closest. How well do you know most of them ? You feel that they are strangers (score 1) You know them very well (score 7)	Comprehensibility	LM Test did not suggest an alternative Manageability (ABM)
F ABM OUM	5. Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well ? Never happened (score 1) Always happened (score 7) (R)	Comprehensibility	LM Test did not suggest an alternative
F OUM	12. Do you have the feeling that you are in an unfamiliar situation and don't know what to do ? Very often (score 1) Very seldom or never (score 7)	Comprehensibility	LM Test did not suggest an alternative
F OUM	15. When you face a difficult problem the choice of a solution is- Always confusing and hard to find (score 1) Always completely clear (score 7)	Comprehensibility	LM Test did not suggest an alternative
F ABM OUM	19. Do you have very mixed up feelings and ideas ? Very often (score 1) Very seldom or never (score 7).	Comprehensibility	LM Test did not suggest an alternative

R = reverse score; F = Female group; ABM = Aberdeen male group; OUM = Open University male group.

(continued on next page)

Table 6.14 (continued): Suggetsed Parameter Changes For Comprehensibility From the Wald Test and Lagrange Multiplier Test Using All Subject Groups

Group	Item (Original Dimension)	Would improve fit of model if did not load on "X"	Would improve model if did load on "X"
F OUM	21. Does it happen that you have feelings inside you would rather not feel ? Very often (score 1) Very seldom or never (score 7)	Comprehensibility	LM Test did not suggest an alternative
ABM	24. Does it happen that you have the feeling that you don't know exactly what's about to happen ? Very often (score 1) Very seldom or never (score 7)	Comprehensibility	LM Test did not suggest an alternative
F OUM	26. When something happened have you generally found that - You overestimated or underestimated its importance (score 1) You saw things in the right proportion (score 7)	Comprehensibility	LM Test did not suggest an alternative

R = reverse score; F = Female group; ABM = Aberdeen male group; OUM = Open University male group.

Table 6.15 : Suggetsed Parameter Changes For Manageability From the Wald Test and Lagrange Multiplier Test Using All Subject Groups

Group	Item (Original Dimension)	Would improve fit of model if did not load on "X"	Would improve model if did load on "X"
F ABM OUM	2. In the past when you had to do something which depended upon co-operation with others did you have the feeling that it - Surely wouldn't get done (score 1) Surely would get done (score 7)	Manageability	LM Test did not suggest an alternative
F ABM OUM	6. Has it happened that people who you counted on disappointed you ? Never happened (score 1) Always happened (score 7)	Manageability	LM Test did not suggest an alternative
F ABM OUM	9. Do you have the feeling that you are being treated unfairly ? Very often (score1) Very seldom or never (score 7)	Manageability	LM Test did not suggest an alternative Meaningfulness (F)
F ABM OUM	18. When something unpleasant happened in the past your tendency was - To eat yourself up about it (score 1) To say OK that's it, have to live with it and go on (score 7)	Manageability	LM Test did not suggest an alternative
F ABM	25. Many people - even those with a strong character - sometimes feel like sad sacks in certain situations. How often have you felt this way in the past ? Never (score 1) Very often (score 7). (R)	Manageability	LM Test did not suggest an alternative
F ABM OUM	29. How often do you have feelings that you're not sure you can keep under control ? Very of ten (score 1) Very seldom or never (score 7)	Manageability	LM Test did not suggest an alternative

R = reverse score; F = Female group; ABM = Aberdeen male group; OUM = Open University male group.

Table 6.16 : Suggetsed Parameter Changes For Meaningfulness From the Wald Test and Lagrange Multiplier Test Using All Subject Groups

Group	Item (Original Dimension)	Would improve fit of model if did not load on "X"	Would improve model if did load on "X"
ABM	11. Most of the things you do in the future will probably be - Completely fascinating (score 1) Deadly boring (score 7) (R)	General factor	LM Test did not suggest an alternative
F	4. Do you have the feeling that you don't really care about what goes on around you ? Very seldom or never (score 1) Very often (score 7) (R)	Meaningfulness	LM Test did not suggest an alternative

R = reverse score; F = Female group; ABM = Aberdeen male group; OUM = Open University male group.

From the findings above it would appear that several items outlined by Antonovsky (1987) as loading on Comprehensibility and Manageability do not do so in any of the 3 samples. Meaningfulness appears to be more accurately defined than the other dimensions.

Beyond the findings reported tables 6.14 - 6.16, the results suggested that for the best model fit in relation to the female group Comprehensibility should not correlate with either Manageability or Meaningfulness, for the Open University male group, that Comprehensibility should not correlate with Meaningfulness and for the Aberdeen male group that Comprehensibility should not correlate with Manageability (see appendix XIII). Thus there is more clarity in the items across samples than in the dimensions. The correlation of Manageability and Meaningfulness does however, appear to contribute to the goodness of fit in this model across all samples. Notably stopping only one item from loading on Meaningfulness would improve the fit suggesting a good basic match between the items which load on this factor and the theory of the item groupings. This it will be remembered is what Antononvsky (1987) describes as the central element of sense of coherence.

The findings strongly support the theory of a general factor across all samples but that certain items may not be loading on the factors suggested by Antonovsky (1987). There are no sex differences in the findings.

The suggestions for added parameters from the Lagrange Multiplier Test for this model are far fewer than for the hardiness model. These are reported in appendix XIII. They do not have any consistency across samples as both items suggested in

need of possible reassignment to another factor in the Open University male group are from Meaningfulness, all from the Aberdeen male group are from Comprehensibility and all but one from the female group are Manageability

Finally the internal consistency of the dimensions of the Sense of Coherence Questionnaire and the Dispositional Resilience Scale were examined using Cronbach's Alpha in order to assess internal reliability and construct validity. These are reported below in tables 6.17 and 6.18.

Table 6.17 Cronbach's Alpha for Sense of Coherence Dimensions and Total Score

Group	SOC Total	Comprehensibility	Manageability	Meaningfulness
OU Male	. 92	. 82	. 85	. 77
Aberdeen Male	. 91	. 83	. 81	. 75
OU Female	. 89	. 76	. 74	. 79

Note: SOC = Sense of Coherence; OU = Open University.

Table 6.18 Cronbach's Alpha for Dispositional Resilience Scale Dimensions and Total Score

Group	HardinessTotal	Commitment	Control	Challenge
OU Male	. 88	. 88	. 72	. 6
Aberdeen Male	. 81	. 77	. 51	. 61
OU Female	. 78	. 77	. 44	. 55

Note: OU = Open University.

The findings in table 6.17 and 6.18 reveal that the internal consistency of the Sense of Coherence dimensions are somewhat higher than those of the Dispositional Resilience Scale. In the Dispositional Resilience Scale Commitment appears most internally consistent with the female group having low scores on both Control and

Challenge. The higher internal consistency on the total scores reflects the increased number of items included in the calculation and should not be interpreted as evidence of unitary constructs.

Chapter7 CONTENTS

CONTENTS

CONTENTS

CHAPTER 7 DISCUSSION

7 DISCUSSION

The main aim of this study has been to assess the fit of the data collected using the Sense of Coherence Questionnaire and the Dispositional Resilience Scale with the theoretical models of hardiness and sense of coherence. This assessment of fit of the models was carried out as part of the overall aim of the research to assess the standardisation, in particular the clinical utility and validity, of the measures. As use of these instruments, should they be found valid, is most likely be in prophylactic care or health prediction within the workplace, non clinical populations have been used.

Results of the Confirmatory Factor Analyses throw into question both the sense of coherence and hardiness models in their current form. These in conjunction with other relevant findings which relate to the overall clinical utility and validity of the measures, will be reviewed in this final section.

7.1 CONFIRMATORY FACTOR ANALYSIS OF SENSE OF COHERENCE QUESTIONNAIRE

Data gathered using the Sense of Coherence Questionnaire suggested that the sense of coherence model appears to be close to the recommended level of fit (.9, Bentler, 1989). The Comparative Fit Index (CFI) ranged from .851 - .871 across the 3 groups. The findings based on the results of the Wald Test (for dropping parameters) highlight common areas where changes would improve the fit in all samples. Many of the items were found to load on the general factor while Wald Test findings suggested that they should not load on either their specified dimension or, according to the findings of the Lagrange Multiplier Test (for adding parameters), on any other dimension within the measure. This suggests that in the data gathered from the Sense of Coherence Questionnaire, there may be at least one other factor which has so far

remained unidentified but which contributes to the general factor of sense of coherence.

7.2 CONFIRMATORY FACTOR ANALYSIS OF DISPOSITIONAL RESILIENCE SCALE

The hardiness model proposed by Bartone et al. (1989) is so far from that produced by the data from the Aberdeen male group that the *EQS program could not compute the statistics. As Bartone et al.s' subjects were a captive group while the Aberdeen male group had to return the battery of measures by post, the latter group may have been higher in motivation which may be considered as an extraneous variable in these results. The CFI for the Open University groups are both extremely low (CFI =.64, .645) suggesting that the hardiness model was inconsistent with the data observed here and may be in need of major changes. Findings in relation to this model are not as clear-cut as the sense of coherence model and raise the possibility that it is unrepresentative of the current data groups and inconsistent across samples. As with the Sense of Coherence Questionnaire many of the hardiness items have been found to load on the general factor while Wald Test findings suggested that they should not load on either their specified dimension, or, according to the findings of the Lagrange Multiplier Test, on any other dimension within the measure. This suggests that there may be at least one additional factor which contributes to hardiness.

That many items do not load on the general factor or any dimension, and that the findings of the Lagrange Multiplier Test do not propose where they might load to improve the model, suggests that some items in the Dispositional Resilience Scale may not be representative of the general hardiness factor measured by this questionnaire at all.

* EQS is not an abbreviation

The two main points are therefore that Dispostional Resilience Scale includes questions which contribute to the total hardiness score but which do not covary with their specified dimensions and also that certain items do not appear to be representative of hardiness at all.

7.3 RELIABILITY

The necessary requirement of any clinical questionnaire is to be standardised, i.e. reliable and valid across different situations and experimenters (Anastasi, 1990). Reliability examines the ratio of true variance to total test variance in a score i.e. the likelihood that keeping all other things constant, the score for a certain person will be the same if measured at any given time. Validity refers to the content of the test being relevant to the characteristics being measured i.e. whether it measures what it says it does. Although this study concentrates on validity, no measure can be considered valid if it is not already reliable. While mentioned previously, the available literature on reliability of the measures will be briefly outlined below for clarity at this point.

7.3.1 INTERNAL CONSISTENCY

Internal consistency demonstrates that a measure reliably measures common elements across items. It also demonstrates construct validity which examines the internal structure of the test. Where there is internal consistency, the items which make up the construct are considered to be homogenous, suggesting good construct validity is present (Anastasi, 1990).

7.3.1.1 INTERNAL CONSISTENCY OF SENSE OF COHERENCE

In the literature so far, Cronbach's alpha of internal consistency is reported for 27 studies using the Sense of Coherence Questionnaire (Antonovsky,1993) and ranged

from 0.82 - 0.95, Frenz, Carey, and Jorgensen (1993) reported 0.93. This is in keeping with the current findings which ranged from .89 - .92 for the total score. The dimensions were somewhat lower ranging from .74 - .85. Meaningfulness in particular is found to be just below Anastasi's (1990) suggested level of .8. All dimensions in the female group are also below .8, although due to the size of the groups the alpha levels are still within acceptable limits. Differences in reliability may be due in part to the influence of the different groups used in the research. Alternatively situational effects may alter response patterns to questions which are more state than trait orientated. For example, those which ask about the facet of "time in the present".
In item 16. "Doing the things you do every day is; a source of deep pleasure (score1), a source of pain and boredom" (score, 7,) may be answered differently than items which ask about "time in the past" if the person is currently experiencing temporary hardship but normally perceives everyday life as a rewarding experience.

7.3.1.2 INTERNAL CONSISTENCY OF THE DISPOSITIONAL RESILIENCE SCALE

The Dispositional Resilience Scale (Bartone et al., 1989) is reported to have internal consistency of 0.85 in the one study to report this so far. This is within the range of .78 - .88 found in the total score for the current groups. There is no literature to compare alpha on the dimensions but the present results suggest that only the dimension of Commitment appears to have acceptable internal consistency (.77 -. 88), with Control and Challenge reaching as low as .44 and .55 respectively.

7.3.2 STATE AND TRAIT INFLUENCES

As with sense of coherence this lack of reliability may be due to the questionnaires being composed of a mix of state and trait items with the state items being more dynamic. Unlike the Sense of Coherence Questionnaire there is no

specification about time scale making the items even more ambiguous. For example, in item 4. "No matter how hard I try my efforts usually accomplish nothing", could refer to experiences in the past week, or general approaches to life. It is not clear how each person will interpret this and as with the comment made about the sense of coherence a recent experience of hardship may colour the persons answer. This would not be obvious when it is scored and interpreted by the researcher thus introducing error variance.

7.4 VALDITY

7.4.1 VALDITY OF ITEMS WHICH MAKE UP EACH DIMENSION

Construct validity and internal consistency may be affected if the dimensions are not validly assessed. As mentioned earlier, the decision that discrimination between high stress / high illness and high stress/ low illness would be the criterion for inclusion of scales was not maintained in the Unabridged Hardiness Scale (Hull et al., 1987) which was used as the basis for the Dispositional Resilience Scale. Of the six scales which make up the Unabridged Hardiness Scale, only 3 (Alienation From Self, External Locus of Control, Powerlessness) distinguished between high and low illness in Kobasa's (1979) original study. Inclusion of these non-discriminative scales may not be representative of hardiness and may therefore not covary with the elements of the dimension which do validly represent hardiness, thus reducing internal consistency.

7.4.2 VALIDITY OF SENSE OF COHERENCE MODEL

Although the model suggested by Antonovsky (1987) of 3 factors and 1 independent factor appears to provide the best fit with each of the current samples, the areas of change suggested by the Wald and Lagrange Multiplier Tests are not consistent. As was discussed in the results section (table 6.6), all other models were shown to be significantly worse in fit despite having the increased degrees of freedom

provided by more constrained models. There are several possibilities as to why this occurred. Firstly, the model of sense of coherence as proposed by Antonovsky (1987) may be valid but the questionnaire may not be representative of the theoretical constructs. Secondly, the questionnaire may be highly representative of the theory but the theory itself may be lacking in validity. As a final alternative, the subjects used may have given rise to cohort effects or some combination of these problems has occurred.

7.4.2.1 VALIDITY OF COMPREHENSIBILITY

Items from the Comprehensibility dimension load most heavily on the general factor across all subject groups. This suggests some consistency in this dimension in representing what may be considered as sense of coherence but little inter-relationship between the items which make up the dimension of Comprehensibility itself. This again raises questions about its validity as a construct.

The Lagrange Multiplier Test suggests that in both the male and female Open University groups item (8), "Until now your life has had, no / very clear goals and purpose", should load on both Comprehensibility and Meaningfulness. As it is not possible to plan for a goal without some understanding of the situation, it can be seen how this Meaningfulness item would dovetail with Comprehensibility. This overlap of dimensions is, however, in contradiction with Antonovsky's aims in relation to the Sense of Coherence Questionnaire.

7.4.2.2 VALDITY OF MANAGEBILITY

The Manageability dimension is less consistent using the current data. Items load most heavily on the general factor alone in the Aberdeen male and Open University female groups but load on both the Manageability and general factor in the Open University male group. This suggests that with these samples at least, sex does not account for a large amount of variability in this dimension.

There may be some cohort effect within the Open University male group which contributes to the perception of Manageability accounting for a larger part of the overall sense of coherence construct. For example, as Manageability is at least partially socially based as a resource, the experience of coping as a male student may be more collaborative than the experience of coping once men have entered the work environment. The differences in fit of the data to the models across each subject group notably does not support Antonovsky's aim to produce a socio-culturally free measure which can be used with any group.

7.4.2.3 VALIDITY OF MEANINGFULNESS

In the Aberdeen male group, around half of the Meaningfulness items load most heavily on the dimension itself, while in both the Open University groups Meaningfulness loads consistently on both its own dimension and the general factor. This supports the findings in study 3 that after Bonferroni Correction, there are no sex differences in the total scores on Meaningfulness. This is useful validation that a type II error had not occurred as prior to Bonferroni Correction there appeared to be a significant sex difference in total scores on this dimension.

In the current results Meaningfulness appeared to be most accurately defined in that the findings on the Wald test suggest that only one item should be dropped and that only in the female group.

Specifically the item,

(4) Do you have the feeling that you don't really care what goes on around you ?

appears to be the only Meaningfulness item which does not ask about the person's life in the past, present or future. It deals more with the person's environment than their internal selves which may explain the Wald Test findings. The person may have consistent ideas about their internal selves but their ideas about their environment may not run in parallel thus resulting in an inconsistent item in the dimension. For example, they may take great care of their own lives but may draw back from becoming involved

in what goes on around them, if this is interpreted as other people's concern. These influences would not be evident from answers to the question. In this way item 4. may reduce internal reliability and construct validity of the Meaningfulness dimension.

Finally in relation to Meaningfulness the findings from the Lagrange Multiplier Test suggest that, in the male Open University group the following item,

(11)Most of the things you do in future will probably be completely fascinating / deadly boring.

should load on both Meaningfulness and Manageability.

It can be seen how a future event must first be considered as feasible and within the person's ability to cope, before it can become interesting. If it is simply viewed as unobtainable they may choose to avoid it (Ingledew, et al., 1996) by finding it boring. Once again this item response pattern may be particular to the Open University group of men due to a cohort effect among men who attempt further education at a later stage in their lifecycle. The world of study, for example, may be increasingly meaningful to them as they discover that they can achieve in this area.

7.4.2.4 VALIDITY ACROSS DIMENSIONS

These findings suggest that the majority of items in the Sense of Coherence questionnaire have more in common than they have individuating them from one another. If, as suggested by Antonovsky, the items have elements in them which are specific to one dimension alone, as well as loading on the general factor, the Wald and Lagrange Multiplier Tests should not have produced any parameters which needed to be dropped or added. Thus, the findings suggest that for the most part in these samples, the items are not dimension specific.

Several changes are suggested consistently across the 3 groups for Manageability and Comprehensibility.

For example, the following items are from the dimension of Comprehensibility.

(1) When you talk to people do you have the feeling that they don't understand you ?

(5) Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well ?

It is suggested from the results of the Wald test that items 1 and 5 should not load on the Comprehensibility dimension, but can load only on the general factor in order to improve the fit of the model. Thus they are tapping into an aspect of the general factor of sense of coherence which is not covered by Comprehensibility or any of the other 2 dimensions.

Working backwards from clinical examples of those who might experience the type of social detachment described in these items, may offer some insight into the coping resources being tapped int his instance. For example, according to Yusupoff, Haddock, Sellwood and Tarrier (1996) clients suffering from schizophrenia will often feel detached from those around them believing that they themselves are misunderstood. They tend to attribute any positive events as caused by something internal and stable. Negative events are seen as being caused by others external to them who are carrying out bizarre negative actions as a result of disposition rather than situational factors. This tendency to look externally for the causes of negative events is reported as occurring most frequently when self esteem is threatened. Thus negative answers to the questions above, if given by this population, might reflect low self esteem, which in turn affects perception of others' behaviour and results in feelings of estrangement.

In another clinical example, Beidel and Turner (1998) describe social phobia as the most common of the anxiety disorders, affecting around 2% of the population in the USA. Among this group there is a tendency to experience low self esteem and to feel criticised, alienated and misunderstood by others. Hackmann, Surawy and Clark (1998) also cite examples of socially phobic clients' beliefs that they will be seen by others as odd, stupid, boring or inarticulate in social situations. This too would be

reflected in answers to item 1 above as the person may feel isolated and misunderstood as a consequence of their belief that they are not communicating effectively.

Although a clinical population is likely to be operating at the extremes of the spectrum of behaviour and psychological functioning, arguably findings relating to them have relevance for the general population. Ingledew et al. (1996) describe avoidance as one of the main coping strategies which has been defined in the literature to date. Where those with schizophrenia often create their own world for self protection, the non-clinical population may in a less extreme way apply avoidance coping when they feel that their self esteem is under threat. This link in areas other than schizophrenia is supported by Fennel's (1997) model which connects self esteem with anxiety and depression, both of which frequently involve avoidance behaviour (Hallam, 1985). The line between a person's belief that they are shy and their seeking help for social phobia may not be clear cut. Thus the non clinical population who might be described as shy may also report these problems of low self esteem and self criticism in social situations, to a lesser degree.

These examples serve to highlight how the sense of coherence questions, while aiming to cover the dimension of Comprehensibility, may instead have been tapping alternative aspects of behaviour, personality and coping, such as social anxiety (Eysenck & Eysenck, 1964), self esteem (Fennel, 1997) or generalised self efficacy (Lightsey, 1996). As these may simply be alternative coping strategies not covered elsewhere in the measure, this may explain the fact that they load on the general factor of sense of coherence but not on any of the other dimensions. These could be considered as general resistance resources as described by Antonovsky (1987). In this way it can be seen how they might contribute to a general sense of well-being and thus increase the correlations with mental and physical health reported in Antonovsky (1993) while still reducing the validity of the dimensions.

The Wald and Lagrange Multiplier Tests also suggest that some items should load on more than one dimension which is once again in contradiction with Antonovsky's (1987) claims that Guttman's Facet Theoretical Design enabled items to

load on only one of the dimensions at a time. It may be that this approach is somewhat unrealistic. As Breakwell et al. (1995) comment, psychological constructs are rarely orthogonal and it is never entirely unexpected to have a degree of overlap.

Where findings are consistent across all subject groups it is with reference to the removal of an item from loading on either Manageability or Comprehensibility.

7.4.3 VALIDITY OF HARDINESS MODEL

It is evident from the literature reviewed in table 6.1 that there is little consistency between data gathered using hardiness measures and the model of hardiness proposed by Kobasa (1979). This was once again confirmed in the current study and raises the question of construct in relation to the dimensions which make up the Dispositional Resilience Scale.

7.4.3.1 CONSTRUCT VALDITY

Internal consistency discussed earlier, is one contributory element of construct validity, as without a stable internal structure, any criterion related validity studies become questionable. Findings in the current study are indicative of a model with low internal consistency, reliability and construct validity across the 3 adult groups used. As internal consistency and construct validity are intertwined there may be some overlap in these sections. The problems highlighted within the current data in relation to each dimension of the Dispositional Resilience Scale are addressed individually below.

7.4.3.2 CONSTRUCT VALDITY OF CONTROL

In the dimension of Control it is possible that situational factors may influence a person's perception of their abilities. For example a person who generally feels that they have high internal control may find themselves in a junior position at work with little input to decisions. Thus item 11, "It's usually impossible for me to change things at work " may be answered in such a way that it does not reflect their general

perception of their ability to exercise control but only their perception in regard to that particular situation. This could lead to low internal consistency and questionable construct validity of the Control dimension.

The phrasing and scoring of the items which make up Control appears to assume that control is beneficial in all situations as a high score is considered to reflect the presence of what is construed as a positive coping skill. Ingledew, Hardy, Cooper and Jamal (1996) suggest that perception of control may be important when considering the effectiveness of approach or avoidance strategies. It may be useful to realise when a situation is beyond our control and to withdraw for self preservation. Avoidance may indeed be a misnomer in this situation as it is generally considered to be a maladaptive strategy. Roger and Nash (1995) for example, describe detachment coping which enables the person to put distance between themselves and the stressful event in order to make a rational plan to deal with the situation. As a rational plan may be, not becoming involved in some event beyond their control, Roger and Nashs' "detachment" appears to describe more accurately a coping process in which a person is learning and adapting. Avoidance on the other hand suggests lack of thought and planning.

Someone who, therefore, believes they have control in all situations may not be displaying the necessary adaptability of detachment and rational thinking, which makes this coping resource beneficial. They may alternatively have high emotional coping such as Type A, aggressiveness and hostility which is associated with coronary heart disease and premature death (Miller, Smith, Turner, Guijarro & Hallet, 1996). Low self esteem may also play a part in this as Miller et al. (1996) describe the development of hostility in childhood as being influenced by parental behaviour which does not include genuine acceptance, is highly critical and is inconsistent with discipline. This is consistent with Fennel's (1997) model of self esteem in which baseline expectations of self are grounded in childhood and will, therefore, be influenced by early experiences of being parented. The presence of any of these less adaptive coping styles or

psychological difficulties may reduce the validity of what is being measured and thus reduce the internal consistency.

It is therefore possible that some respondents on the Dispositional Resilience Scale will recognise that although they have a high internal locus of control in many situations this does not occur on all occasions. Their scores on Control may, as a consequence, be moderate. Others may respond to the general flavour of the items that they are being asked about whether or not they feel they can cope most of the time, thereby gaining a higher score. Still others who do not recognise the need for flexibility but simply perceive themselves as in control of any situation may gain a higher score. Thus in terms of construct validity there may be no distinction between those who perceive themselves as having a beneficial level of internal control and those who are rigid and aggressive.

Sex differences may influence the validity of the dimensions. For example, in relation to perception of control, Guyll and Contrada (1998) report a 3 way interaction between sex, hostility and talking in a social situation. Males in their study who had high hostility scores reported less negative affect while they were talking during a social interaction. This suggests that the perception of being in control may have significantly affected their mood and that reports of feeling in control amongst such a group would not necessarily be indicative of positive coping.

7.4.3.3 CONSTRUCT VALIDITY OF CHALLENGE

Challenge has been an area of concern from the outset of hardiness (Kobasa & Maddi, 1982) and it would appear that this construct remains somewhat ill defined and questionable (Carver, 1989; Compton, Seeman & Norris, 1991). Hull, Van Treuren & Virnelli's (1987) findings that the security scale recommended as a measure of Challenge by Kobasa and Maddi (1982) did not consistently load on any one factor is supported by the data obtained in the present study showing a lack of high loadings of the Challenge items on both the Challenge and general factors. This, in conjunction

with the low internal consistency of the Challenge dimension, raises questions about its existence as a construct. On the basis of both past and current findings it is possible to suggest that the influence of the Challenge dimension may significantly contribute to the low CFI of the hardiness model.

In the current study, despite areas of change which were consistent across both the male and female Open University groups, the suggestions as to where the items should load instead were often inconsistent. For example, as discussed in the results section (see table 6.11) in the case of several Challenge items the findings of the Wald and Lagrange Multiplier Tests suggest that the model would be improved if items 20, 21, and 35 did not load on either Challenge or the general factor for both male and female groups.

20. I won't answer a question until I'm really sure I understand it.
21. I like a lot of variety in my work.
35. People who do their best should get full support from society.

The results of the present study therefore highlight the possibility that these items have little in common with each other and little in common with the general hardiness factor.

For certain items of Challenge where no recommendation is made to drop parameters in the male group, an alternative of Control or Commitment was proposed for the female group. For example, the findings indicate that loading on Commitment would improve the fit of items 12 and 38 on the model.

12. New laws should never hurt a person's pay-check.
38. I have no use for theories that are not closely tied to facts.

The findings of this study suggest that for Challenge item (33) "I like it when things are uncertain or unpredictable", loading on Control would improve the overall fit of the model.

This lack of consistency may be due to either sex differences in responses or to a cohort effect such that error variance was increased. Alternatively, Challenge, as

defined by Bartone et al. (1989) may not be validly represented by the items which make up the dimension or the Challenge construct itself may be invalid. Overall this dimension does not appear to contribute to the general factor of hardiness.

7.4.3.4 CONSTRUCT VALIDITY OF COMMITMENT

The claim by Hull et al. (1987) that Commitment may be the most stable and valuable dimension of hardiness is not supported by the current findings. The Wald Test suggests that over half of the items should not load on this dimension, with 7 of these being consistent in both the male and female groups. As highlighted in the results section (table 6.4), items from this dimension tend to load more heavily on the general factor than on the dimension itself for the female group. This tendency is also present in the male group (see appendix X) but to a lesser extent. Also in the male group, the majority of the Commitment items are negatively loaded on Commitment while being positively loaded on the general factor. This contradicts Bartone et al.'s (1989) aims to create a measure in which all the dimensions are positively loaded on the general factor. This is only the case for 2 of the items in the female group.

This suggests that the items may have some common element which accounts for the acceptable level of internal consistency. However, the common element does not appear to be Commitment as outlined in the DRS hardiness theory, i.e. it does not positively contribute to the general hardiness construct.

Sex differences may also contribute to Commitment's lack of construct validity. In the male group, Commitment is a negative indicator of the hardiness construct with significant negative loadings on the Commitment factor. In the female group the picture is less clear-cut as there is a mixture of positive and negative loadings on the Commitment factor with fewer than those in the male group reaching significance.

Examining some examples of Commitment items from table 6.11, it is possible to hypothesise about what the common elements might be and about whether it is

possible that men and women respond differently to these. The development of the hardiness theory on data obtained from mainly male groups may have created a measure which is less attuned to female coping or which uses language or situations which are less relevant to women. For example, many of the Commitment items are about the work environment from which many women are arguably, more likely to be detached, due to child rearing. The use of work orientated questions also precludes those who do not work outwith the home from relating to this type of item.

Alternatively the varying areas of importance to each sex, discussed in chapter 5 (Waelde, Silvern & Hodges, 1994) may explain some of the sex differences in scoring. The tendency of men to seek achievement through mastering things in their environment while women are more frequently relationship orientated, may explain differences in their perceived areas of importance. In this way the areas where each sex feels themselves to be committed may be different and this may be reflected in the scores on this dimension. The fact that in the present study, the Dispositional Resilience Scale produces more sex differences in scoring than the Sense of Coherence Questionnaire may be accounted for at least partially by the increased emphasis on work in the hardiness measure compared with the Sense of Coherence Questionnaire.

Returning to the issue of mastery, the following Commitment items appear to reflect helplessness or low internal control, which may result in sex differences in scoring. Based on Waelde et al. (1994) men may be more likely to feel it is socially unacceptable
to admit to lack of command.

(9) Most working people are simply manipulated by their bosses (reverse score)

(37) People who believe in individuality are kidding themselves (reverse score)

(24) Thinking of yourself as free just leads to frustration (reverse score)

In each of these statements it would be expected that someone with a tendency to attribute the causes of problems externally, thus displaying feelings of low control or low self esteem would tend to respond to these items in a similar way. As a result of

this they may indeed produce a lower score on Commitment but it is unclear whether this information tells any more than would a measure of self esteem or control.

Some of the other items on Commitment may reflect alienation from either the work culture or from feeling productive in society, as work is commonly perceived as representing a meaningful contribution to society. Alternatively this may be a cohort effect of the Open University sample, in that its members had reached a point in work which was unsatisfactory and had returned to studying in order to affect a change. In order to justify this effort to themselves, they might endorse this distancing from work in the traditional sense on the one hand, while actually being extremely committed to their life of study. If they therefore respond to the literal meaning of the item as opposed to the presumed intention to assess commitment, they may respond with an apparent lack of commitment. As can be seen below the questions do not ask about study. For example,

(41) It's hard to imagine anyone getting excited about work.

(45) Ordinary work is just too boring to be worth doing.

It is possible that if these items had been more general in asking about how day to day life is spent and whether it is invigorating, then different trends may have been evident in the loadings.

7.4.3.5 NEGATIVE SCORING IN CONSTRUCT VALIDITY OF HARDINESS

It would seem that the assumption implicit in the Dispositional Resilience Scale is that lack of a negative perception of belief means the presence of a positive one. For instance, item 7."Working hard doesn't matter since only the bosses profit by it" (reverse score) seems to be considered as having a linear relationship with the belief that - working hard does matter as not only the bosses profit by it. In other words the item is asking what the person does not believe in order to assume what they do believe. Research has, however, suggested that there is independence between negative

and positive thought processes (Amsel & Fichten, 1998) and that they do not have the linear relationship which might be assumed intuitively. In the light of this, it is possible that the large number of reverse scored items on the Dispositional Resilience Scale in contrast with the Sense of Coherence Scale may have contributed to the low internal consistency and lack of construct validity.

7.5 CONVERGENT AND DISCRIMINANT VALIDITY

Convergent validity is used to assess the extent to which a psychological measure correlates with variables with which it would be expected to correlate according to the underlying theory. It is necessary that any psychological measure should be able to remain distinct from those variables with which, according to the theory, it would not be expected to correlate, i.e. discriminant validity.

In the following section information on variables which correlate with the constructs and to what extent each measure should converge with, or discriminate from these is considered.

7.5.1 CONVERGENT AND DISCRIMINANT VALIDITY OF SENSE OF COHERENCE

7.5.2 CONVERGENCE WITH PSYCHOLOGICAL WELL-BEING

As mentioned earlier, it would be expected from the literature (Antonovsky, 1987; 1993) that sense of coherence would correlate with psychological well-being. This is supported by the current findings. Sense of coherence may be related to psychological well-being and may be predictive in pinpointing those with increased potential for affective disorder. However, in the context of the findings reported in

Study 1, it might be argued that this may be due to the confounding effects of personality

7.5.3 CONFOUNDING EFFECTS OF NEUROTICISM

The Sense of Coherence Questionnaire should be independent of, or be able to provide more information than, personality measures in order to justify the existence of the measure. Whether this is the case is, however, questionable as Neuroticism is related to psychological problems such as the risk of becoming clinically depressed and the time taken to recover from it, (Martin,1985), low adaptability (Costa & McCrae, 1987) and low self-esteem (Teasdale & Dent, 1987). In the current study, it is more highly correlated than the Sense of Coherence Questionnaire, with psychological well-being for all with the exception of the male Open University for which it was found that Sense of Coherence correlates slightly more highly with the General Health Questionnaire than does Neuroticism. This does not produce a consistent picture and is suggestive of either differences in the subject groups or lack of reliability in the measures used. If Neuroticism is found to be consistently related to psychological well-being and to have a higher correlation with it than sense of coherence, it must then be asked what benefit the Sense of Coherence Questionnaire has over and above the Eysenck Personality Inventory.

It is possible for example, that the Sense of Coherence Questionnaire is measuring both strengths and needs in coping but that only the strengths have been recognised in the theory. It may be that the overlap with Neuroticism is caused by measuring what Roger and Nash (1995) describe as the maladaptive strategies of "emotional" and "avoidance" coping. Other variance in the relationship with psychological well-being may have arisen because the Sense of Coherence Questionnaire is also measuring what Roger and Nash (1995) describe as the adaptive strategies of "rational" and "detached" coping. These more functional approaches to

coping involve empowerment in which the person can consciously plan and help themselves without being influenced by emotional volatility.

If the Sense of Coherence Questionnaire is indeed found to be measuring both strengths and needs in coping this would fulfil the criteria of providing information above and beyond that of the Eysenck Personality Inventory.

The reason for the overlap between Sense of Coherence and Neuroticism may be the similarity in theme found in the items on the respective measures. For example;

(18) When something unpleasant happened in the past your tendency was to

1	2	3	4	5	6	7
eat yourself up about it						to say OK that's it I have to live with it and go on

(26) When something happened you generally found that

1	2	3	4	5	6	7
you over estimated or under estimated its importance						you saw things in the right proportion

Both of these items have a similar theme to the following questions on worrying taken from the Neuroticism scale on the Eysenck Personality Inventory.

(14) Do you often worry about things you should not have done or said ?
(28) After you have done something important do you often come away feeling you could have done better ?

Alternatively, Neuroticism may be a higher order variable which aspects of sense of coherence and psychological health have in common. This view is supported by the suggestion that Neuroticism can be seen as contributing to emotionally focused

coping and avoidance, 2 of the 3 elements of coping discussed by Ingledew et al. (1996). For example, it might be argued that a person who has an increased score on neuroticism may invest less in any learning experience in case they fail. This suggests the presence of both emotionally focused coping and avoidance. Looking at a clinical example, a person with panic disorder may avoid the places they fear as they have panicked, shaken and had palpitations there at some point and feel unable to cope in that situation. In this way they do not develop coping skills for this area of life. Although, in certain threatening situations where control is not possible avoidance behaviour may be a good shorterm survival technique, it may still preclude development of other types of coping if it is generalised to other situations.

Taking this example a step further, it appears, however, that dismissing the information gleaned from the Sense of Coherence Questionnaire as simply revealing the presence or absence of Neuroticism may miss valuable clinical information. An individual might answer yes to Q 35 (EPI) "Do you get attacks of shaking and trembling ? ". This may be indicative of neuroticism but is also a symptom of a panic attack. This person may, furthermore, express their ability to cope i.e. Manageability as being low on the Sense of Coherence Questionnaire as they feel that the situation is beyond their available skills or resources. If it is assumed that information from scores on either the Dispositional Resilience Scale or the Sense of Coherence which reveal a low level of coping resources, tells us no more than a high neuroticism score, the client is left with few options. If, however, the lack of Manageability for example, is seen as coexisting with, or being an element of Neuroticism the client may be empowered to increase their ability to cope through being taught new skills to deal with the panic. This suggests how the Sense of Coherence Questionnaire may offer information above and beyond that of the Eysenck Personality Inventory despite the possibility of Neuroticism as a confounding element.

7.5.4 CONFOUNDING EFFECTS OF EXTROVERSION IN RELATION TO SENSE OF COHERENCE

In the current study, the Sense of Coherence Questionnaire is correlated with Extroversion for both the Open University groups. It has not exhibited the consistent relationship of Neuroticism with sense of coherence and hardiness which has been evident throughout the studies. As both the Sense of Coherence Questionnaire and Extroversion correlate with the General Health Questionnaire in the current study it is possible that this personality element may be a mediating variable between sense of coherence and health but only in certain populations. For example, it may be remembered that (Gray, 1981) suggests that those who are more extrovert will be more likely to be conditioned by the possibility of positive reinforcement. This, it was suggested earlier might lead to those with increased Extroversion increasing their approach behaviour and thus exposure to learning and coping strategies. The fact that sense of coherence is correlated with Extroversion in only the Open University groups of both sexes, may suggest a cohort effect of those who are seeking further education at a later age. This activity itself is very much an approach strategy which carries risk of failure but great benefits from success. Thus those with increased Extroversion according to Gray's (1981) theory would be more likely to pursue this course of action.

7.5.5 DISCRIMINANT VALIDITY OF SENSE OF COHERENCE

Discriminant validity is not documented to date on the Sense of Coherence Questionnaire. It was reported by Hart, Hittner and Paras (1991) to be unrelated to socially based stress-resistance resources. However, this study involved the use of the 13-item, short form scale. As the short and long form Sense of Coherence Questionnaires are considered to be highly correlated, however, this does provide some validity (Antonovsky, 1987).

7.6 HARDINESS

7.6.1 CONFOUNDING EFFECTS OF NEUROTICISM

The Dispositional Resilience Scale (DRS), similar to the Sense of Coherence Questionnaire, negatively correlates with the General Health Questionnaire which provides some measure of convergent validity. Once again, Neuroticism was found to be more highly correlated with psychological health than is the measure under investigation.

There are examples of questions from the DRS which appear to tap into elements of Neuroticism. For example;

Q 2 (DRS) Trying hard doesn't pay as things still don't turn out right. Although asking about Control, this item may also tap into pessimism and worry and therefore covary with questions such as Q40 (EPI) Do you worry about awful things that might happen?

Similar arguments to those raised in relation to the Sense of Coherence Questionnaire, Neuroticism and the General Health Questionnaire, apply to the Dispositional Resilience Scale and will not therefore be repeated here. It may be that Neuroticism confounds the Dispositional Resilience Scale but if there is any validity in the dimensions of the measure, enabling clients to classify their strengths and needs in this way may be more empowering than classifying them as having high or low Neuroticism.

7.6.2 CONFOUNDING EFFECTS OF EXTROVERSION

Extroversion, although significantly correlated with scores on the General Health Questionnaire, does not significantly correlate with Hardiness in either of the current male groups. This suggests that, in this instance at least, it does not act as a mediating variable between hardiness and health.

In relation to the female sample, Extroversion and Hardiness were found to be highly significantly correlated. This may reflect an increased role for Extroversion as a mediating variable between hardiness and psychological well-being in this group. As hardiness was more highly correlated with scores on the General Health Questionnaire than Extroversion, the latter cannot be considered to be the main coping resource measured by the Dispositional Resilience Scale. It is possible that in concurrence with Gray's (1981) theory this reflects increased approach coping in this group.

7.7 PREDICITVE VALIDITY

7.7.1 PREDICTIVE VALIDITY OF SENSE OF COHERENCE

Studies which include predictive validity of the Sense of Coherence Questionnaire suggest that those with low scores experience more stress after an expected difficult situation while those with higher scores display more approach coping such as situational analysis and planning (McSherry & Holm, 1994). Sense of coherence was also found to predict both physical and mental health at 6 month follow-up in an all male group (Coe, Romeis, Tang & Wolinsky, 1990).

Some studies which included information on predictive validity have, however, been questionable. For example, Petrie and Brooks' (1992) study used the dimensions of the Sense of Coherence Questionnaire separately to assess predictive validity for reattempting suicide in psychiatric patients. They concluded that the individual dimensions of Manageability and Comprehensibility correlated most strongly with suicidal ideation and behaviour in comparison with depression, hopelessness or self esteem, at a six month follow-up. As Antonovsky (1987; 1993) advises that the composite score should be used rather than the individual dimension scores, use of the dimensions in this way requires justifications which were not made available in the literature. The current findings that the dimensions themselves appear to be unreliable, raises further doubts about Petrie and Brooks' study.

7.7.2 PREDICTIVE VALIDITY OF THE DISPOSITIONAL RESILIENCE SCALE

There is no information on the predictive validity of Dispositional Resilience Scale.

7.8 FACE VALIDITY

Anastasi (1990) describes face validity as important in building rapport with those who will use the test. Indeed, without subject compliance to fill in a measure it will be of little use to a practitioner. The possibility that the measure may be asking socially undesirable questions must also be considered as this will influence response patterns (Burns, 1979).

Verbal feedback from subjects on the face validity of the measures in this instance was positive. The Dispositional Resilience Scale was found to be less tiring to complete than the Sense of Coherence Questionnaire due to the single page presentation and the uniformity of item format.

7.9 NORMATIVE DATA

7.9.1 NORMATIVE DATA IN THE SENSE OF COHERENCE QUESTIONNAIRE

The provision of normative data has not been addressed in the literature on the Sense of Coherence Questionnaire, which raises the following issues.

The differences of age between the current sample and those of Antonovsky (1987) must be considered when assessing the current findings as coping across the age range may differ.

Ingledew et al. (1996), for example, report that the older individuals in their study had more adaptive problem focused coping and self care and less use of eating, (a more avoidant coping strategy) for coping with stress. Cognitive appraisal of well-being has also been found to increase with age due, for example, to increased satisfaction from work which develops as achievement increases or expectations get lower (Schulz & Heckhausen, 1996). As mentioned earlier, Antonovsky (1987) considered his mixed sex sample as one group, whereas, there are suggestions in the literature of sex differences in coping. For instance, men are considered to feel happier with age while women feel less happy (Argyle,1987).

The creation of a measure which operates across cultures may also be thrown into question if the factors which influence well-being are not the same in each setting. Heine and Lehman (1995) for example, note that cultures which are more community based have more socially orientated goals and well-being is affected by cognitions about social concerns. In Western cultures which have increased individual emphasis the goals are more affected by beliefs about self. This reflects Antonovsky's (1987) emphasis on community resources as opposed to Kobasa's more individual coping skills. It is therefore surprising that being aware of this difference Antonovsky continued to describe sense of coherence as socio-culturally free.

It has been shown that the scores from the present samples may be influenced by their age, sex, the fact that they are seeking out another career by retraining at the Open University and thus have not reached the plateau of career achievement or lowered expectations. If any of the observed differences are due to these factors, Antonovsky's (1993) aim to create a gender and socio-cultural free measure has not been achieved.

As reported in Antonovsky (1993), the normative base for the Sense of Coherence Questionnaire is increasing each year and currently includes at least 20

different nationalities with a wide range of groups within each. In the light of the current findings, however, the body of research discussed by Antonovsky (1987) is placed in question. As mentioned earlier, the lack of a model with an acceptable level of fit suggests that lack of validity may be influencing findings both in the literature and in the current study. As many of these data from the literature, are held centrally in Israel, they might be reanalysed using Confirmatory Factor Analyses in order to refine the model and thus greatly enhancing the available knowledge in this area.

At the current stage in the development of the sense of coherence, findings such as Antonovsky (1993) that undergraduates tend to score slightly lower than the norm, lack authenticity as they assume standardisation of the questionnaire and goodness of fit of the sense of coherence model. It can be argued that the overspecialisation which occurred when Antonovsky chose trauma victims such as concentration camp survivors (Antonovsky, 1987) in the development of the Sense of Coherence Questionnaire may have rendered findings less applicable across the general population. Outwith the original situation, the measures may be limited.

Amirkham (1990) comments that the lack of consensus across studies of coping resources reflects the tendency of researchers to concentrate on specific populations. In this way it is felt that available empirical findings cannot be applied to the general population. From another perspective, however, design of the measure had to have a starting point and assessing what coping resources these extreme cases used to enable maintenance of well-being appears a logical place from which to do so.

7.9.2 NORMATIVE DATA IN THE DISPOSITIONAL RESILIENCE SCALE

As in the case of the Sense of Coherence Questionnaire there are differences between the current samples and the original samples (bus drivers and lower level managers) used to develop the Dispositional Resilience Scale. These differences discussed in section 6.3.4 must be considered when assessing the current findings.

Bartone et al. (1989) do not specify the age of the samples. This leaves open the possibility that age is an extraneous variable although due to the lack of information it is not possible to assess how this may have affected their results.

There may also be sex differences between the original (Bartone et al., 1989) and current samples, however, once again there is no clear information about this aspect of the original samples. As mentioned earlier, the basis of the first and second generation hardiness measures upon which the Dispositional Resilience Scale is based, are clearly mainly male samples (e.g. Maddi, Bartone & Puccetti, 1987; Kobasa, Maddi & Kahn, 1982; Kobasa, 1979) and may reflect situations or language which are, in the main, more relevant to males. As already mentioned with reference to sense of coherence, male and female coping strategies differ. There is therefore a need for additional data specifically related to sex differences in order to assess the utility of the measure for women as well as men.

Collection of normative data may only follow further research into the validity of both the Dispositional Resilience Scale and the underlying hardiness model.

7.10 UNIQUE ELEMENTS OF THE DISPOSITIONAL RESILIENCE SCALE AND THE SENSE OF COHERENCE QUESTIONNAIRE

Certain aspects of the Sense of Coherence Questionnaire and the Dispositional Resilience Scale may be totally unique to the particular measure. For example, the sense of coherence dimension of Manageability which is partly based on community resources may change with situations across time, reflecting a state quality to some aspects of the measure. The questions in both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale which tap aspects of neuroticism, may, in contrast be more stable and trait like. This may account for some variability in the pattern of inter-relationships with psychological well-being and health.

Some of the differences in scoring on the Sense of Coherence Questionnaire and the Dispositional Resilience Scale may be explained by the fact that the latter

measure does not ask any questions about feelings. This, combined with its emphasis on individual control as opposed to more social support, may be more typical of male than female coping responses or may at least be tapping into different personality types. For example, Fairbrother and Morreti (1998) discuss the interpersonally dependent personality for whom acceptance and interpersonal care is necessary for self esteem. Problems in these areas are associated with vulnerability to depression. They also discuss the self critical personality for whom personal achievement and independence are central. This is more typical of Western coping resources (Heine & Lehman, 1995) tapped by the hardiness measure (Antonovsky, 1987) and may be more typical of men than women (Argyle, 1987). Either or both possibilities may account for differences in scoring on the measures.

For the self critical person, the inability to live up to expectations can cause vulnerability to depression. These elements combined with the discrepancy between ideal and actual self, were found to be related, although each individually contributes to negative mood states and depression. In this way correlation between each of the measures under investigation and psychological well-being may be accounted for through assessment of different aspects of vulnerability. In the light of these factors the significantly higher Meaningfulness scores for women in study 3 may, for example, be a reflection of differing personality types.

7.11 AREAS OF OVERLAP BETWEEN THE DISPOSITIONAL RESILIENCE SCALE AND THE SENSE OF COHERENCE QUESTIONNAIRE

It is clear that there is a certain amount of overlap between the 2 measures. This is found to be a common issue when various categories of coping resources are brought together (Stone & Neale, 1984) and it makes considerable sense from a clinical perspective as someone who has positive coping strategies in one area would be more likely to present with a more global positive adjustment (Breakwell, et al.,

1995). As discussed earlier, personality may account for a large amount of this overlap and this is reviewed in a separate section.

It is not possible, however, to assess the extent of overlap using Confirmatory Factor Analysis as there is no theoretical model to test. Similarly it is not possible using this approach to assess the factor structure of the measures without imposing constraints i.e. defining which items will load on which dimensions. In order to address this issue before reviewing the conclusions of the current section a short additional study has been carried out using Exploratory Factor Analysis. This is reported in the following chapter.

Chapter 8 # CONTENTS

Chapter 8 **CONTENTS**

Page

CONTENTS

CONTENTS

CONTENTS

FIGURES **Page**

CONTENTS

FIGURES **Page**

CHAPTER 8

8.1 EXPLORATORY FACTOR ANALYSIS OF THE UNDERLYING CONSTRUCTS WHICH MAKE UP SENSE OF COHERENCE AND HARDINESS

8.2 INTRODUCTION

Having carried out a Confirmatory Factor Analysis on both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale in chapter 6 it has been discovered that in neither measure, with any of the three subjects groups, did the model outlined by the author of the questionnaire fit with that of the available data. Furthermore results of the Lagrange Multiplier and Wald Tests suggested considerable changes were necessary in each measure although more so with reference to the Dispositional Resilience Scale. In order to clarify what type of factor structure does appear to underly these measures both individually and when analysed together, an Exploratory Factor Analysis will be carried out using this same data and discussed in this section.

Similar to a Confirmatory Factor Analysis this techniques examines the underlying constructs of a group of questions, i.e. what are the common themes about which they are asking. The advantage of this in comparison with the earlier Confirmatory Factor Analysis is that no constraints from the theoretical models will be included in the analysis. This has several benefits. Individual items from each measure are left unconstrained, i.e. not attached to a particular dimension. Unlike other studies where the dimensions have been factor analysed (Kobasa, Maddi & Kahn, 1982; Funk & Houston, 1987) no assumption is made that the items taken from a certain dimension will truly represent it and the researcher is able to interpret for themselves which items load on which factors. Also without the constraint of basing analysis on

the theory of one questionnaire at a time it becomes possible to analyse both measures together. This enables assessment of the extent of overlap which is highlighted by Antonovsky (1987) and examination of the factor structure which emerges.

This reduction in empirical constraints may be criticised (Kim & Meuuler, 1978) for increasing the likelihood of misinterpretation of results, however, with all aspects of the analysis carefully defined and detailed this will increase the chance of replication and reduce the error as far as possible (Breakwell, et al. (1995). The exploratory approach is also frequently criticised for being used with little consideration of the process and interpretation. It is important that the factors, or underlying constructs, are not reified as they are not tangible attributes but empirically based groupings. Thurstone (1947) also warns that expectations of the number of factors to be extracted should be based on underlying theory as Exploratory Factor Analysis is essentially descriptive. It is acknowledged that this leads to the circular argument that you are more likely to find what you are looking for and this should be born in mind when interpreting results.

In the current study Principal Components Analysis is used. This technique is slightly different from factor analysis in that Principal Components Analysis does not take account of unique variance, i.e. the combination of error variance plus the qualities which are specific to each item in the analysis and which do not contribute to the common variance which is of interest in the research. It is considered however that the unique variance will have little effect on the first few important factors to be extracted (Child, 1970).

8.3 TERMINOLOGY OF FACTOR ANALYSIS

There are many terms in factor analysis which do not appear in other types of statistical analysis and these will briefly be explained.

The output of an analysis produces factor loadings which can range from 0 - 1. These show how important that particular factor, or group of items, is in that item. For

example the question " Do you like to feel in Control of your work ?" might have a loading of 0.4 on the factor named Locus of Control suggesting that this factor is important in this item. There are 3 types of factors; a general factor which contributes to all items, i.e. an underlying theme, a group factor which contributes to more than one item and a specific factor which contributes to only one item. As the analysis proceeds factors are produced sequentially with each subsequent factor accounting for less of the variance, these decreasing variances are known as eigenvalues. Variables with the largest loadings will give an idea of what the factor represents.

There are several types of variance which are mentioned in reference to factor analysis and these can cause some confusion. The common variance (or communality) reflects the amount of variance which is explained by the extracted factor groups. This does not change after rotation of factors. The total variance consists of common variance plus unique variance thus the lower the common variance the more chance there is of error explaining the correlations which casts doubt on the utility of the measure being examined. The percentage of variance accounted for by each factor changes after rotation as items load differently on the various factors.

Rotation occurs after the initial factor analysis and allows the items to more closely align themselves with a factor. This adjustment is considered to improve interpretation as is either reduces to insignificance or increases those loadings which are unclear. The larger the number of items which are found to covary the greater the potential reliability and construct validity of the measure. Only once these items are found to covary on a regular basis with specific subject groups, or in specific situations, can the measure offer reliable, valid and clinically useful information.

The type of rotation used in the current study is varimax which is orthogonal and is most useful when it is considered that the underlying items will cluster round several factors.

Analyses which are unrotated tend to produce one general factor which over emphasises the relationship of each item to this one factor, thus it is not advisable to base interpretations upon this. As each factor may relate to varying external criteria the

loss of the factor refinement might make the measure less sensitive. In the situation where no convergence occurs after rotation it is probable, however, that the items have been grouped together in as meaningful a way as possible and that no further factor structures are present in the group of items.

As the current Exploratory Factor Analysis is being carried out as a refinement of findings post Confirmatory Factor Analysis. The details of the measures under investigation will not be repeated here but the reader is referred back to the introduction of chapter 6. Details of subjects will be repeated here.

8.4 SUBJECTS

Three samples were used in the current study. These consisted of 174 women from the open university student group discussed in study 3.The mean age of the sample was 33.82 years (SD = 10.22). Two male samples were also used. These were 108 open university males which included a new sample added to those in study 3 in order to provide adequate numbers for factor analysis. The mean age of the sample was 31.73 years (SD = 11.19). Finally a sample of 156 employed males in Aberdeen including for example social services staff, general practitioners, engineers, catering staff, security workers, health and fitness instructors, police. The criteria for inclusion were that the subject was employed, male and working in Aberdeen and over 18 years of age. The mean age of the sample was 37.36 (SD = 9.92).

It is considered that there should always be more subjects than variables and if possible there should be three subjects for each variable. In the current situation where the Sense of Coherence Questionnaire items and the Dispositional Resilience Scale items are analysed together, the samples used are smaller than is desirable and this must be taken into consideration when reviewing the results. Male and female subjects will be analysed separately.

8.5 METHOD

As the same data is used from chapter 6 the details will not be repeated here but are available on page 196-197.

8.6 RESULTS

Exploratory Factor Analysis was performed on the Dispositional Resilience Scale and the Sense of Coherence Questionnaire items both separately and together for each group of subjects. It is important when reporting factor analysis that other researchers will be able to replicate the study and compare results accurately. For this reason it is recommended that the following details are covered; the method is stated, the main factor loadings are detailed in the interpretation, the criterion for deciding upon rotation and how many factors to extract is outlined, and the criterion for deciding whether a loading should be considered as significant or not must be clear. These areas will therefore be covered in order to reduce any potential for problems with this technique.

A principal components analysis was used with orthogonal rotation of the varimax type for analyses of the Dispositional Resilience Scale, the Sense of Coherence Questionnaire and of both measures together, as based on the findings of chapter 6 it would be expected that several factors would emerge in each case. As the Comparative Fit Index for the Sense of Coherence Questionnaire in chapter 6 came so close to the desired level of 0.9 (i.e. .87) using a model of 3 interrelated factors contributing to one general factor, it might be argued that an oblimax rotation which allows items to correlate and is used if one main factor is predicted, appeared to be more suitable in this instance. This was applied initially, however, and as no convergence occurred a varimax rotation was used which produced a refinement in the factors.

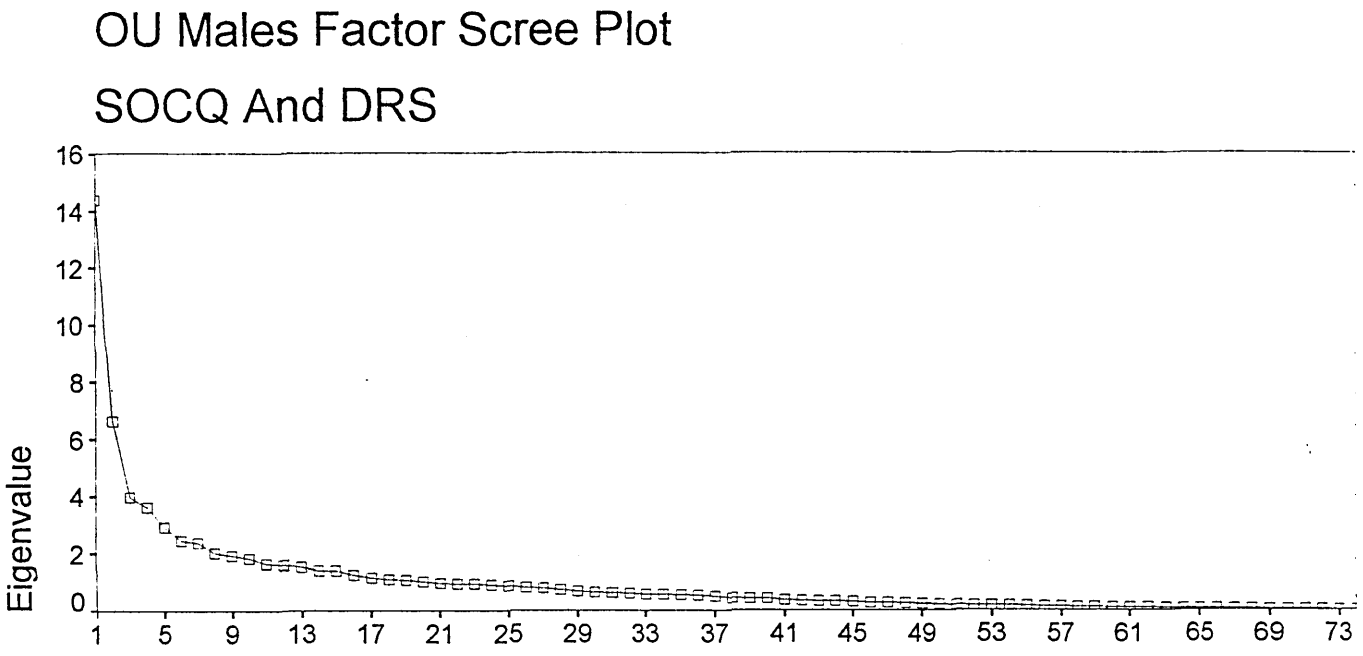
Kaiser's criterion was used in conjunction with examination of screeplots to extract factors. This approach allows for examination of all factors with an eigenvalue

>1 cross referenced with a screeplot (Cattel, 1966) which aims to assess when the largest number of factors which account for common variance before becoming swamped with error variance have been extracted. It is noted by Child (1970) that this approach can lead to over extraction of factors and this will be noted in interpretation of findings. Factor loadings of 0.3 and above were considered (Child, 1970) and it is noted that this may be a conservative estimate the number of items loading on a factor in comparison with the Burt-Banks (1952) approach.

The results from these analyses are reported in the tables and screeplots below.

In the analysis of the Sense of Coherence Questionnaire and the Dispositional Resilience Scale, using the Open University male group data, use of a varimax rotation did not converge and failed to produce any refinement on the basic Principal Components Analysis. Using Kaiser's criterion 20 factors were produced, this was reduced to 5 after examination of the screeplot.

Figure 8.1: Open University Male Group. Screeplot of Exploratory Factor Analysis of Sense of Coherence and Dispositional Resilience Scale Together



Note: SOCQ = Sense of Coherence

DRS = Dispositional Resilience Scale, OU = Open University

Table 8.1 Factors Extracted From Sense of Coherence Questionnaire and Dispositional Resilience Scale When Analysed Together Using Principal Components Analysis

Table 8.1 (Part 1): Open University Males Factor 1 Commitment

Question No.	Dimension	Factor	Loading
H1	Commitment	1	0.631
H7	Commitment	1	0.537
H8	Commitment	1	0.337
H9	Commitment	1	0.51
H17	Commitment	1	0.509
H18	Commitment	1	0.452
H23	Commitment	1	0.458
H24	Commitment	1	0.501
H25	Commitment	1	0.476
H31	Commitment	1	0.449
H37	Commitment	1	0.353
H39	Commitment	1	0.568
H41	Commitment	1	0.452
H44	Commitment	1	0.406
H45	Commitment	1	0.523
H2	Control	1	0.321
H3	Control	1	0.401
H4	Control	1	0.625
H10	Control	1	0.305
H11	Control	1	0.492
H13	Control	1	0.318
H22	Control	1	0.374
H26	Control	1	0.304
H30	Challenge	1	0.402
S1	Comprehensibility	1	0.483
S3	Comprehensibility	1	0.41
S12	Comprehensibility	1	0.62
S15	Comprehensibility	1	0.434
S19	Comprehensibility	1	0.607
S21	Comprehensibility	1	0.658
S24	Comprehensibility	1	0.436
S26	Comprehensibility	1	0.471
S4	Meaningfulness	1	0.416
S7	Meaningfulness	1	0.496
S8	Meaningfulness	1	0.612
S11	Meaningfulness	1	- 0.523
S14	Meaningfulness	1	0.763
S16	Meaningfulness	1	0.643
S22	Meaningfulness	1	0.757
S28	Meaningfulness	1	0.722
S2	Manageability	1	0.412
S6	Manageability	1	0.498
S9	Manageability	1	0.625
S13	Manageability	1	0.52
S18	Manageability	1	0.616
S20	Manageability	1	0.543
S23	Manageability	1	0.456
S25	Manageability	1	0.701
S27	Manageability	1	0.572
S29	Manageability	1	0.652

Note: S = Sense of Coherence; H = Dispositional Resilience Scale.

(Table continues on next page)

Table 8.1 (Part 2): Open University Males Factor 2 Control

Question No.	Dimension	Factor	Loading
H7	Commitment	2	0.321
H9	Commitment	2	0.409
H18	Commitment	2	0.386
H23	Commitment	2	0.313
H24	Commitment	2	0.524
H37	Commitment	2	0.407
H41	Commitment	2	0.353
H44	Commitment	2	0.457
H45	Commitment	2	0.454
H3	Control	2	0.529
H4	Control	2	0.39
H11	Control	2	0.4
H14	Control	2	0.408
H22	Control	2	0.383
H26	Control	2	0.39
H28	Control	2	0.367
H34	Control	2	0.423
H43	Control	2	0.327
H5	Challenge	2	0.424
H12	Challenge	2	0.382
H15	Challenge	2	0.407
H16	Challenge	2	0.33
H27	Challenge	2	0.409
H38	Challenge	2	0.424
S1	Comprehensibility	2	- 0.305
S12	Comprehensibility	2	- 0.314
S15	Comprehensibility	2	- 0.335
S14	Meaningfulness	2	- 0.365
S16	Meaningfulness	2	- 0.387
S22	Meaningfulness	2	- 0.376
S28	Meaningfulness	2	- 0.344
S13	Manageability	2	- 0.304
S25	Manageability	2	- 0.305

Note: S = Sense of Coherence; H = Dispositional Resilience Scale. (Table continues)

Table 8.1 (Part 3: Open University Males Factor 3 Optimism

Question No.	Dimension	Factor	Loading
H1	Commitment	3	- 0.346
H25	Commitment	3	- 0.326
H37	Commitment	3	0.348
H39	Commitment	3	- 0.46
H2	Control	3	- 0.487
H13	Control	3	- 0.489
H19	Control	3	- 0.495
H22	Control	3	- 0.375
H43	Control	3	0.302
H6	Challenge	3	0.478
H12	Challenge	3	0.316
H16	Challenge	3	0.476
H32	Challenge	3	0.551
S10	Comprehensibility	3	- 0.376
S8	Meaningfulness	3	- 0.307

Note: S = Sense of Coherence; H = Dispositional Resilience Scale. (Table continues on next page)

Table 8.1 (Part 4: Open University Males Factor 4 Comprehensibility

Question No.	Dimension	Factor	Loading
H25	Commitment	4	- 0.352
H31	Commitment	4	0.312
S10	Comprehensibility	4	0.432
S17	Comprehensibility	4	0.543
S15	Comprehensibility	4	0.348
S19	Comprehensibility	4	0.393
S21	Comprehensibility	4	0.309
S24	Comprehensibility	4	0.461
S26	Comprehensibility	4	0.324
S7	Meaningfulness	4	- 0.471
S11	Meaningfulness	4	0.469
S13	Manageability	4	- 0.316
S20	Manageability	4	- 0.352
S29	Manageability	4	0.322

Note: S = Sense of Coherence; H = Dispositional Resilience Scale.
(Table continues)

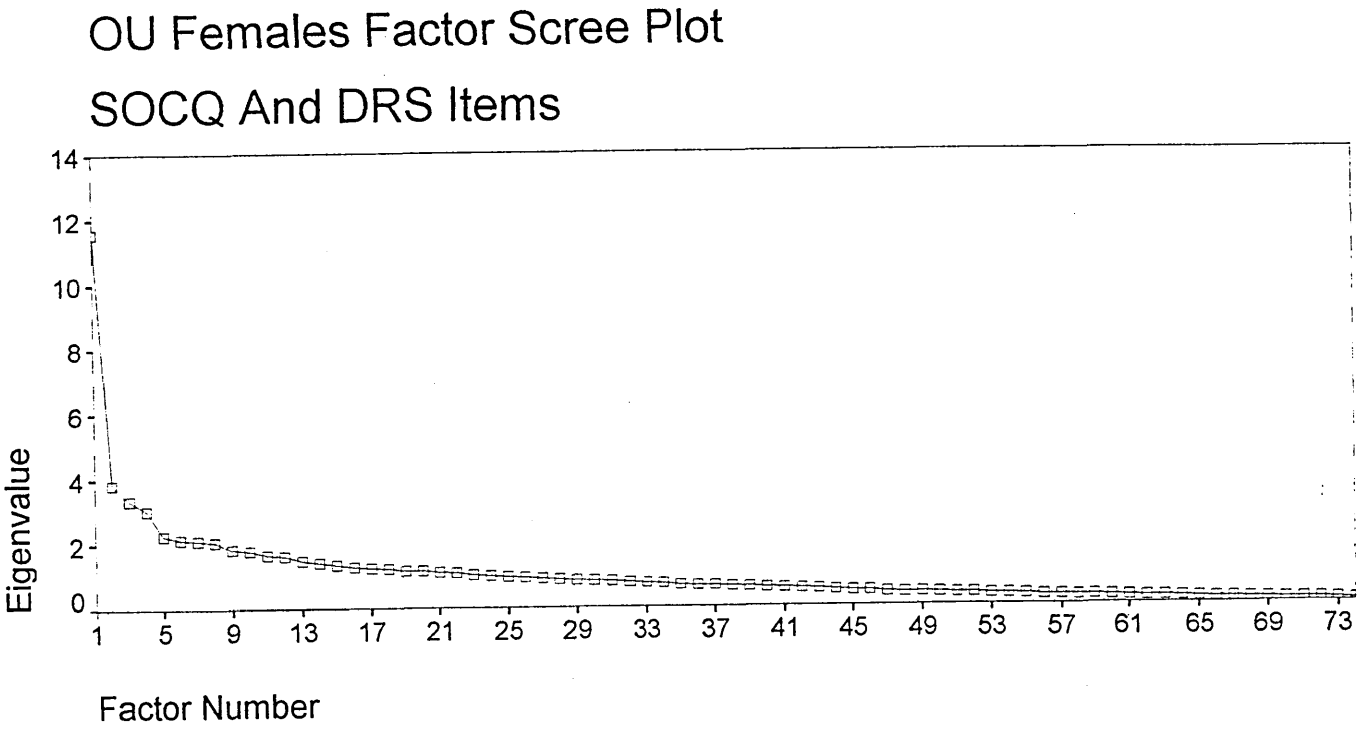
Table 8.1 (Part 5): Open University Males Factor 5 Challenge

Question No.	Dimension	Factor	Loading
H9	Commitment	5	- 0.315
H14	Control	5	0.328
H22	Control	5	0.382
H28	Control	5	- 0.418
H5	Challenge	5	0.356
H21	Challenge	5	0.368
H33	Challenge	5	0.493
H36	Challenge	5	0.493
15	Comprehensibility	5	0.322

Note: S = Sense of Coherence; H = Dispositional Resilience Scale.

Use of a varimax rotation for the Open University female group did not converge and failed to produce any refinement on the basic Principal Components Analysis. Using Kaiser's criterion 23 factors were produced, this was reduced to 4 after examination of the screeplot.

Figure 8.2: Open University Female Group. Screeplot of Exploratory Factor Analysis of Sense of Coherence and Dispositional Resilience Scale Together



Note: SOCQ = Sense of Coherence Questionnaire

DRS = Dispositional Resilience Scale, OU = Open University

Table 8.2 Factors Extracted From Sense of Coherence Questionnaire and Dispositional Resilience Scale When Analysed Together Using Principal Components Analysis

Table 8.2 (Part 1: Open University Females Factor1 Sense of Coherence

Question No.	Dimension	Factor	Loading
H1	Commitment	1	0.35
H7	Commitment	1	0.402
H17	Commitment	1	0.467
H18	Commitment	1	0.372
H23	Commitment	1	0.514
H24	Commitment	1	0.505
H25	Commitment	1	0.372
H31	Commitment	1	0.4
H39	Commitment	1	0.65
H41	Commitment	1	0.319
H3	Control	1	0.348
H4	Control	1	0.504
H11	Control	1	0.345
H13	Control	1	0.365
H19	Control	1	0.332
H22	Control	1	0.456
H26	Control	1	0.304
H34	Control	1	0.32
H5	Challenge	1	0.355
H27	Challenge	1	0.494
H30	Challenge	1	0.588
S1	Comprehensibility	1	0.325
S5	Comprehensibility	1	0.41
S12	Comprehensibility	1	0.504
S15	Comprehensibility	1	0.613
S19	Comprehensibility	1	0.718
S21	Comprehensibility	1	0.604
S24	Comprehensibility	1	0.464
S26	Comprehensibility	1	0.481
S4	Meaningfulness	1	0.339
S7	Meaningfulness	1	0.562
S8	Meaningfulness	1	0.56
S11	Meaningfulness	1	0.47
S14	Meaningfulness	1	0.383
S16	Meaningfulness	1	0.446
S22	Meaningfulness	1	0.786
S28	Meaningfulness	1	0.697
S2	Manageability	1	0.305
S6	Manageability	1	0.382
S9	Manageability	1	0.591
S13	Manageability	1	0.434
S18	Manageability	1	0.467
S20	Manageability	1	0.454
S23	Manageability	1	0.428
S25	Manageability	1	0.493
S27	Manageability	1	0.529
S29	Manageability	1	0.526

Note: S = Sense of Coherence; H = Dispositional Resilience Scale.

(Table continues on next page)

Table 8.2 (Part 2: Open University Females Factor2 Challenge

Question No.	Dimension	Factor	Loading
H8	Commitment	2	- 0.372
H37	Commitment	2	0.353
H2	Control	2	- 0.345
H10	Control	2	0.338
H13	Control	2	- 0.43
H19	Control	2	- 0.4
H22	Control	2	- 0.46
H42	Control	2	- 0.369
H43	Control	2	- 0.37
H6	Challenge	2	0.43
H12	Challenge	2	0.438
H15	Challenge	2	- 0.374
H20	Challenge	2	0.434
H21	Challenge	2	- 0.332
H35	Challenge	2	0.467
H40	Challenge	2	0.342

Note: S = Sense of Coherence; H = Dispositional Resilience Scale.
(Table continues)

Table 8.2 (Part 3: Open University Females Factor3 Commitment

Question No.	Dimension	Factor	Loading
H7	Commitment	3	0.415
H8	Commitment	3	0.463
H17	Commitment	3	0.326
H37	Commitment	3	0.4
H44	Commitment	3	0.343
S10	Comprehensibility	3	- 0.327
S12	Comprehensibility	3	- 0.448
S17	Comprehensibility	3	- 0.372
S19	Comprehensibility	3	- 0.307
S26	Comprehensibility	3	- 0.37
S2	Manageability	1	0.305
S18	Manageability	3	- 0.408
S20	Manageability	1	0.454
S27	Manageability	3	- 0.039

Note: S = Sense of Coherence; H = Dispositional Resilience Scale.
(Table continues)

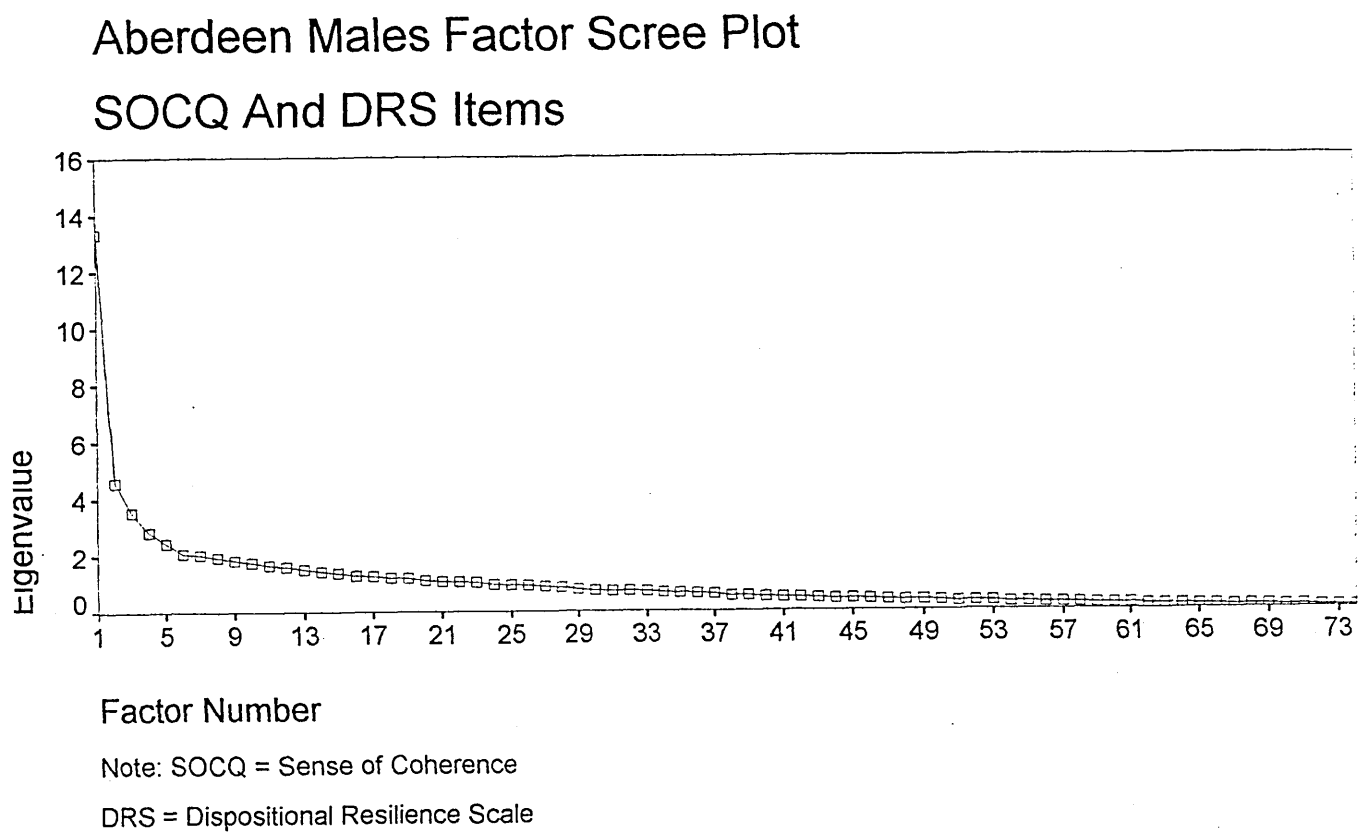
Table 8.2 (Part 4: Open University Females Factor 4 Comprehensibility

Question No.	Dimension	Factor	Loading
H37	Commitment	4	- 0.532
H34	Control	4	- 0.45
H5	Challenge	4	- 0.444
H27	Challenge	4	- 0.458
S10	Comprehensibility	4	0.534
S24	Comprehensibility	4	0.38
S17	Comprehensibility	4	0.577

Note: S = Sense of Coherence; H = Dispositional Resilience Scale.

Use of a varimax rotation with the Aberdeen male group produced no refinement of the findings of the basic principal components analysis. Using Kaiser's criterion 23 factors were produced, this was reduced to 5 after examination of the screeplot.

Figure 8.3: Aberdeen Male Group. Screeplot of Exploratory Factor Analysis of Sense of Coherence and Dispositional Resilience Scale Together



Note: SOCQ = Sense of Coherence

DRS = Dispositional Resilience Scale

Table 8.3 Factors Extracted From Sense of Coherence Questionnaire and Dispositional Resilience Scale When Analysed Together Using Principal Components Analysis with an Orthogonal Rotation Using the Varimax Technique

Table 8.3(Part 1: Aberdeen Male Group. Factor1 Meaningfulness

Question No.	Dimension	Factor	Loading
H1	Commitment	1	0.421
H39	Commitment	1	0.622
H15	Challenge	1	0.399
H30	Challenge	1	0.442
S21	Comprehensibility	1	0.313
S4	Meaningfulness	1	0.444
S7	Meaningfulness	1	0.748
S8	Meaningfulness	1	0.303
S11	Meaningfulness	1	- 0.622
S14	Meaningfulness	1	0.673
S16	Meaningfulness	1	0.691
S22	Meaningfulness	1	0.698
S28	Meaningfulness	1	0.718
S13	Manageability	1	0.47
S20	Manageability	1	0.452
S27	Manageability	1	0.626

Note: S = Sense of Coherence; H = Dispositional Resilience Scale.
(Table continues)

Table 8.3(Part 2: Aberdeen Male Group Factor 2 Comprehensibility

Question No.	Dimension	Factor	Loading
H17	Commitment	2	0.382
H23	Commitment	2	0.352
H31	Commitment	2	0.422
S10	Comprehensibility	2	0.485
S12	Comprehensibility	2	0.555
S15	Comprehensibility	2	0.434
S17	Comprehensibility	2	0.659
S19	Comprehensibility	2	0.719
S21	Comprehensibility	2	0.69
S24	Comprehensibility	2	0.733
S26	Comprehensibility	2	0.463
S8	Meaningfulness	2	0.352
S14	Meaningfulness	2	0.3
S28	Meaningfulness	2	0.373
S9	Manageability	2	0.389
S18	Manageability	2	0.512
S25	Manageability	2	0.595
S29	Manageability	2	0.579

Note: S = Sense of Coherence; H = Dispositional Resilience Scale. (Table continues on next page)

Table 8.3(Part 3: Aberdeen Male Group Factor 3 Self Efficacy

Question No.	Dimension	Factor	Loading
H7	Commitment	3	0.763
H9	Commitment	3	0.776
H17	Commitment	3	0.329
H18	Commitment	3	0.314
H25	Commitment	3	0.4
H3	Control	3	0.522
H11	Control	3	0.432

Note: H = Dispositional Resilience Scale. (Table continues)

The majority of items in the factor above are centred around the belief that individual effort, even within a large organisation or societal setting, can make a difference.

Table 8.3(Part 4: Aberdeen Male Group Factor 4 Commitment

Question No.	Dimension	Factor	Loading
H37	Commitment	4	0.48
H44	Commitment	4	0.744
H45	Commitment	4	0.552
H29	Control	4	0.428
H6	Challenge	4	0.315
H38	Challenge	4	0.415

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.3(Part 5: Aberdeen Male Group Factor 5 Flexibility

Question No.	Dimension	Factor	Loading
H15	Challenge	5	0.379
H32	Challenge	5	0.392
H33	Challenge	5	0.513
H36	Challenge	5	0.767

Note: H = Dispositional Resilience Scale.

The findings of the Open University male and female groups are very similar suggesting that the first factor may be a general factor and that subsequent factors may be subgroups of what is contained within the first factor. The exception to this is that the Challenge dimension items appear to load on only the factors subsequent to factor 1. Findings also suggest a considerable overlap between what is measured by the Sense of Coherence Questionnaire and the Dispositional Resilience Scale.

Findings from the Aberdeen male group are somewhat different. This may be partially explained by the successful varimax rotation as there is a tendency for

principal components analysis which is not rotated to overload somewhat on the first factor. Findings with this group suggest 5 factors which are interrelated to certain extent although with less overlap between the 2 measures than in the other groups.

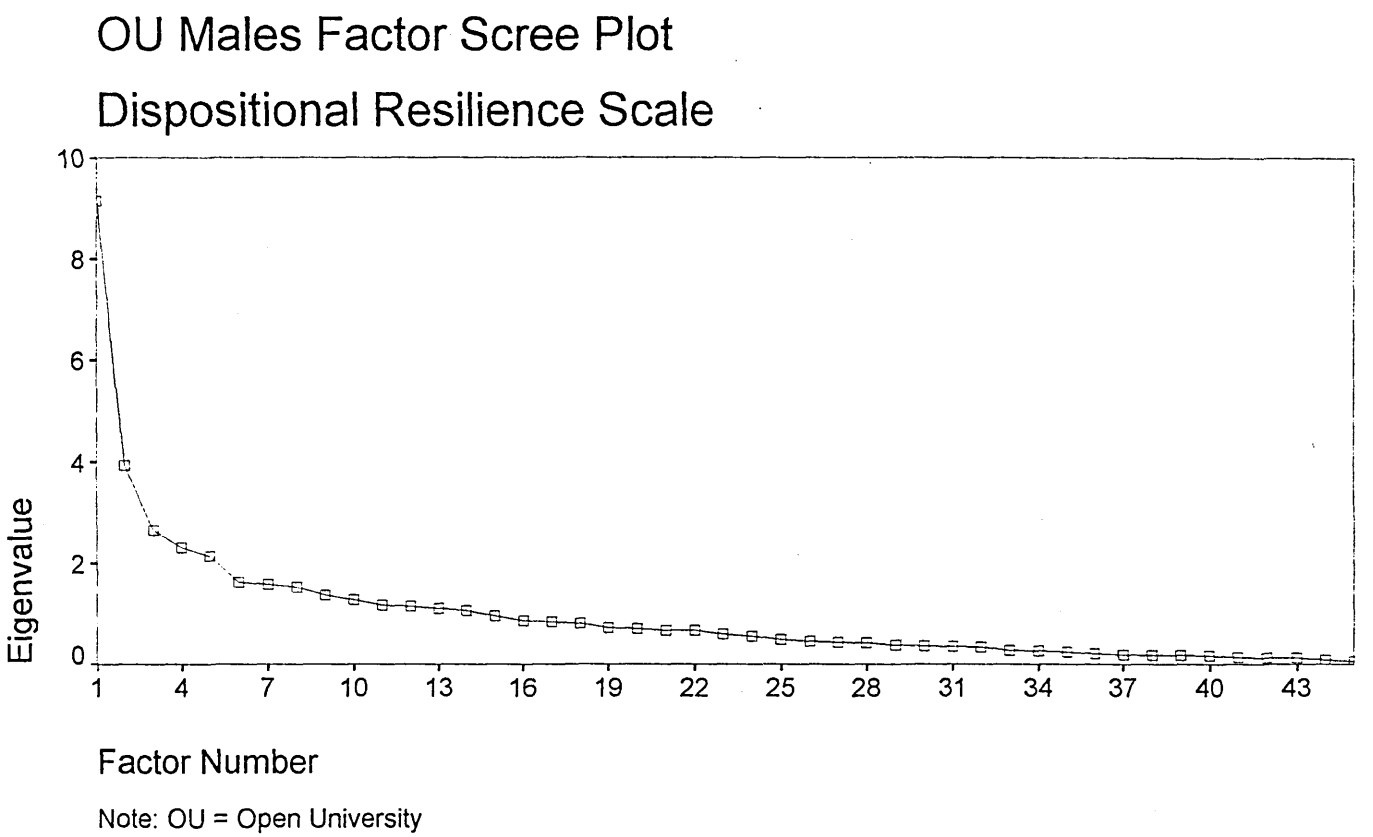
Factors have been named after the dimension upon which they load most heavily. If this is unclear a definition which attempts to encompass the more heavily loaded items is used.

Overall the difference in results across the 3 groups suggests either cohort effects, a lack of reliability and validity in both measures across groups or a combination of these effects.

In the next set of tables the findings from the Exploratory Factor Analysis of the Dispositional Resilience Scale for each of the 3 subject groups are reported along with the corresponding screeplots.

Principal Components Analysis with a varimax rotation was used in analysis of the Dispositional Resilience Scale for the Open University male group. Using Kaiser's criterion 14 factors were produced, this was reduced to 5 after examination of the screeplot.

Figure 8.4: Open University Male Group. Screeplot of Exploratory Factor Analysis of Dispositional Resilience Scale



Note: OU = Open University

Table 8.4 Open University Male Group. Factors Extracted From Dispositional Resilience Scale When Analysed Using Principal Components Analysis with an Orthogonal Rotation Using the Varimax Technique

Table 8.4 (Part 1: Open University Males. Factor1 Control

Question No.	Dimension	Factor	Loading
H1	Commitment	1	0.508
H31	Commitment	1	0.641
H41	Commitment	1	0.357
H2	Control	1	0.657
H4	Control	1	0.489
H11	Control	1	0.308
H13	Control	1	0.65
H14	Control	1	0.376
H22	Control	1	0.662
H32	Challenge	1	-0.412

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.4 (Part 2: Open University Males. Factor2 Self Efficacy

Question No.	Dimension	Factor	Loading
H7	Commitment	2	0.426
H18	Commitment	2	0.396
H37	Commitment	2	0.807
H41	Commitment	2	0.307
H44	Commitment	2	0.643
H45	Commitment	2	0.356
H3	Control	2	0.36
H4	Control	2	0.318
H34	Control	2	0.303
H43	Control	2	0.471
H16	Challenge	2	0.496
H38	Challenge	2	0.443

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.4 (Part 3: Open University Males. Factor3 Work Fulfillment

Question No.	Dimension	Factor	Loading
H7	Commitment	3	0.515
H8	Commitment	3	0.754
H9	Commitment	3	0.612
H18	Commitment	3	0.496
H23	Commitment	3	0.313
H25	Commitment	3	0.692
H39	Commitment	3	0.325
H3	Control	3	0.446
H4	Control	3	0.311
H11	Control	3	0.342

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.4 (Part 4: Open University Males. Factor4 Flexibility

Question No.	Dimension	Factor	Loading
H24	Commitment	4	0.324
H2	Control	4	- 0.366
H5	Challenge	4	0.773
H6	Challenge	4	0.418
H27	Challenge	4	0.783
H33	Challenge	4	0.41
H36	Challenge	4	0.646

Note: H = Dispositional Resilience Scale. (Table continues)

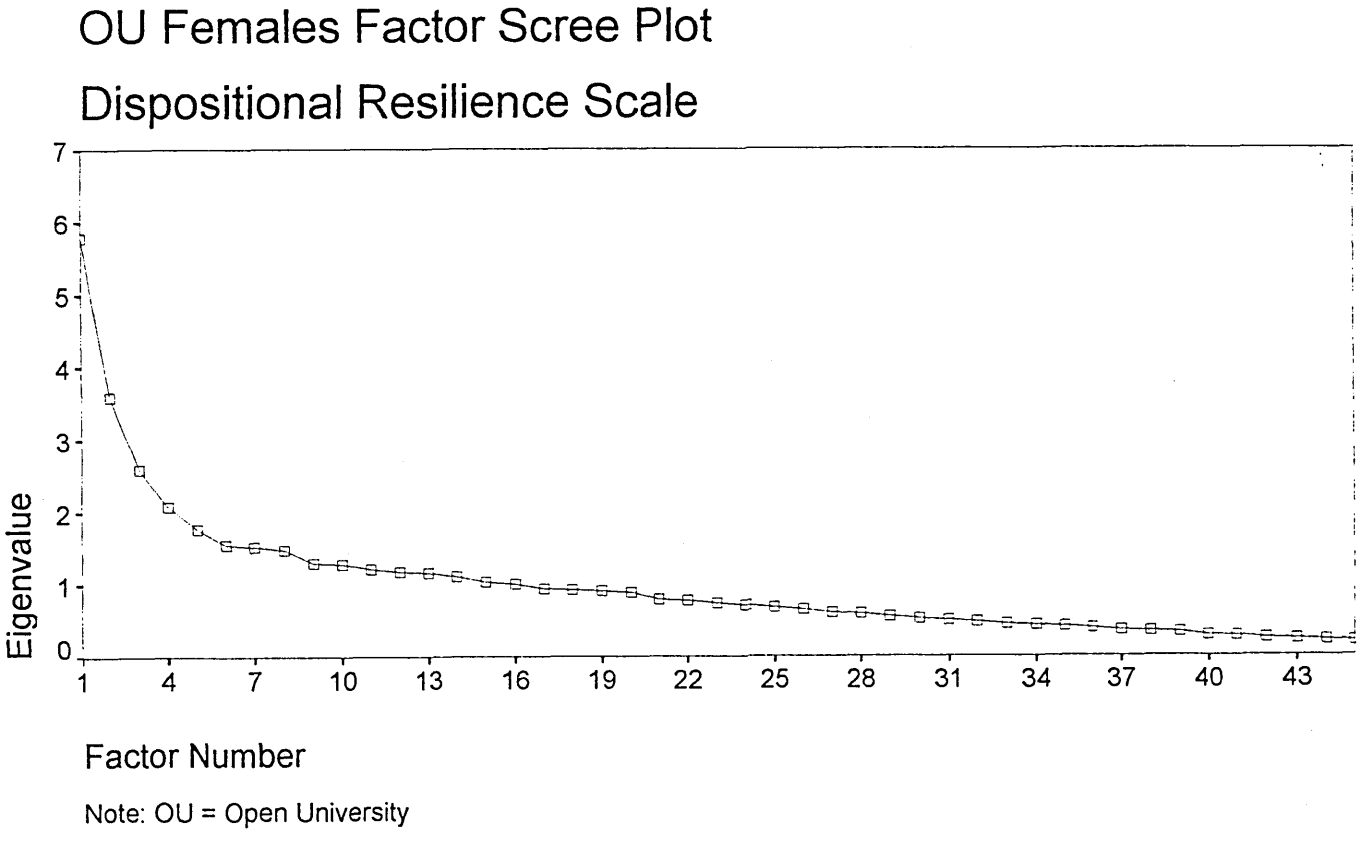
Table 8.4 (Part 5: Open University Males. Factor5 Alienation From Work

Question No.	Dimension	Factor	Loading
H9	Commitment	5	0.465
H41	Commitment	5	0.319
H45	Commitment	5	0.364
H3	Control	5	0.33
H11	Control	5	0.413
H26	Control	5	0.321
H33	Challenge	5	- 0.443

Note: H = Dispositional Resilience Scale.

Principal Components Analysis with a varimax rotation was used in analysis of the Dispositional Resilience Scale for the Open University female group. Using Kaiser's criterion 16 factors were produced, this was reduced to 4 after examination of the screeplot.

Figure 8.5: Open University Female Group: Screeplot of Exploratory Factor Analysis of Dispositional Resilience Scale



Note: OU = Open University

Table 8.5 Open University Female Group. Factors Extracted From Dispositional Resilience Scale When Analysed Using Principal Components Analysis with an Orthogonal Rotation Using the Varimax Technique

Table 8.5 (Part 1: Open University Females Factor1 Commitment

Question No.	Dimension	Factor	Loading
H1	Commitment	1	0.582
H17	Commitment	1	0.486
H23	Commitment	1	0.37
H24	Commitment	1	0.391
H31	Commitment	1	0.307
H39	Commitment	1	0.743
H3	Control	1	0.345
H10	Control	1	0.36
H22	Control	1	0.444
H30	Challenge	1	0.656

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.5 (Part 2: Open University Females Factor2 Flexibility

Question No.	Dimension	Factor	Loading
H34	Control	2	0.602
H5	Challenge	2	0.792
H27	Challenge	2	0.791
H36	Challenge	2	0.706

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.5 (Part 3: Open University Females Factor3 Work Fulfillment

Question No.	Dimension	Factor	Loading
H7	Commitment	3	0.313
H8	Commitment	3	0.78
H25	Commitment	3	0.706
H22	Control	3	0.405
H34	Control	3	0.519

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.5 (Part 4: Open University Females Factor4 Entitlement

Question No.	Dimension	Factor	Loading
H41	Commitment	4	0.462
H45	Commitment	4	0.404
H43	Control	4	0.545
H12	Challenge	4	0.606

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.5 (Part 5: Open University Females _ Factor5 Self Confidence

Question No.	Dimension	Factor	Loading
H31	Commitment	5	0.508
H26	Control	5	0.769
H34	Control	5	0.32
H42	Control	5	- 0.574

Note: H = Dispositional Resilience Scale.

Principal Components Analysis with a varimax rotation was used in analysis of the Dispositional Resilience Scale for the Aberdeen male group. Using Kaiser's criterion 15 factors were produced, this was reduced to 4 after examination of the screeplot.

Figure 8.6: Aberdeen Male Group. Screeplot of Exploratory Factor Analysis of Dispositional Resilience Scale

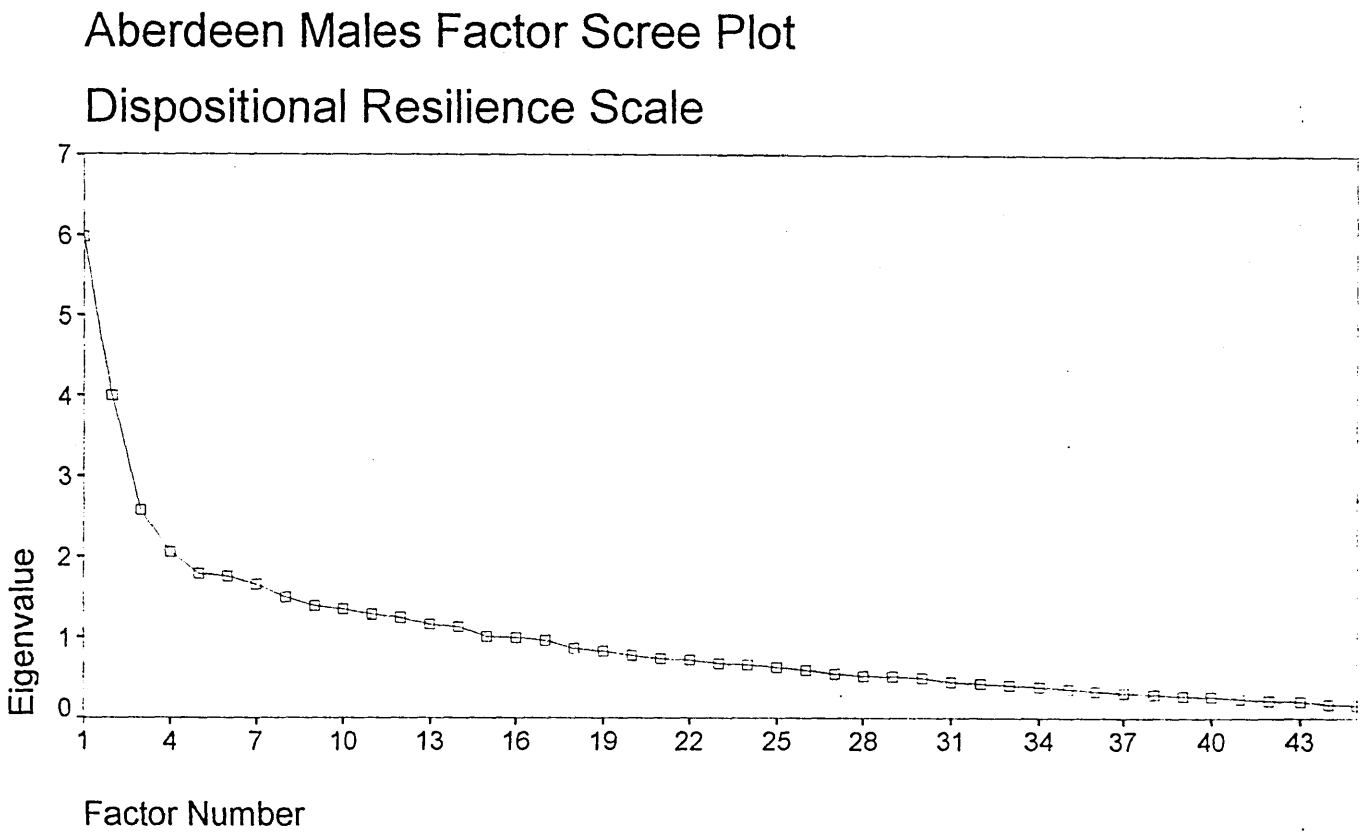


Table 8.6 Aberdeen Male Group. Factors Extracted From Dispositional Resilience Scale When Analysed Using Principal Components Analysis with an Orthogonal Rotation Using the Varimax Technique

Table 8.6 (Part 1: Aberdeen Males. Factor1 Commitment

Question No.	Dimension	Factor	Loading
H1	Commitment	1	0.591
H7	Commitment	1	0.402
H17	Commitment	1	0.634
H24	Commitment	1	0.309
H25	Commitment	1	0.396
H39	Commitment	1	0.796
H41	Commitment	1	0.319
H4	Control	1	0.504
H13	Control	1	0.42
H22	Control	1	0.584
H5	Challenge	1	0.355
H15	Challenge	1	0.547
H30	Challenge	1	0.715

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.6(Part 2: Aberdeen Male Group Factor 2 Self Efficacy

Question No.	Dimension	Factor	Loading
H7	Commitment	2	0.776
H9	Commitment	2	0.751
H17	Commitment	2	0.368
H18	Commitment	2	0.311
H25	Commitment	2	0.363
H41	Commitment	2	0.367
H45	Commitment	2	0.382
H3	Control	2	0.639
H4	Control	2	0.384
H11	Control	2	0.411
H16	Challenge	2	0.304

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.6(Part 3): Aberdeen Male Group Factor3 Inspiration

Question No.	Dimension	Factor	Loading
H37	Commitment	3	0.395
H44	Commitment	3	0.61
H45	Commitment	3	0.575
H28	Control	3	0.525
H38	Challenge	3	0.676

Note: H = Dispositional Resilience Scale. (Table continues)

Table 8.6(Part 4): Aberdeen Male Group Factor4 Flexibility

Question No.	Dimension	Factor	Loading
H28	Control	4	0.33
H34	Control	4	0.427
H5	Challenge	4	0.719
H27	Challenge	4	0.828
H36	Challenge	4	0.416
H40	Challenge	4	0.315

Note: H = Dispositional Resilience Scale.

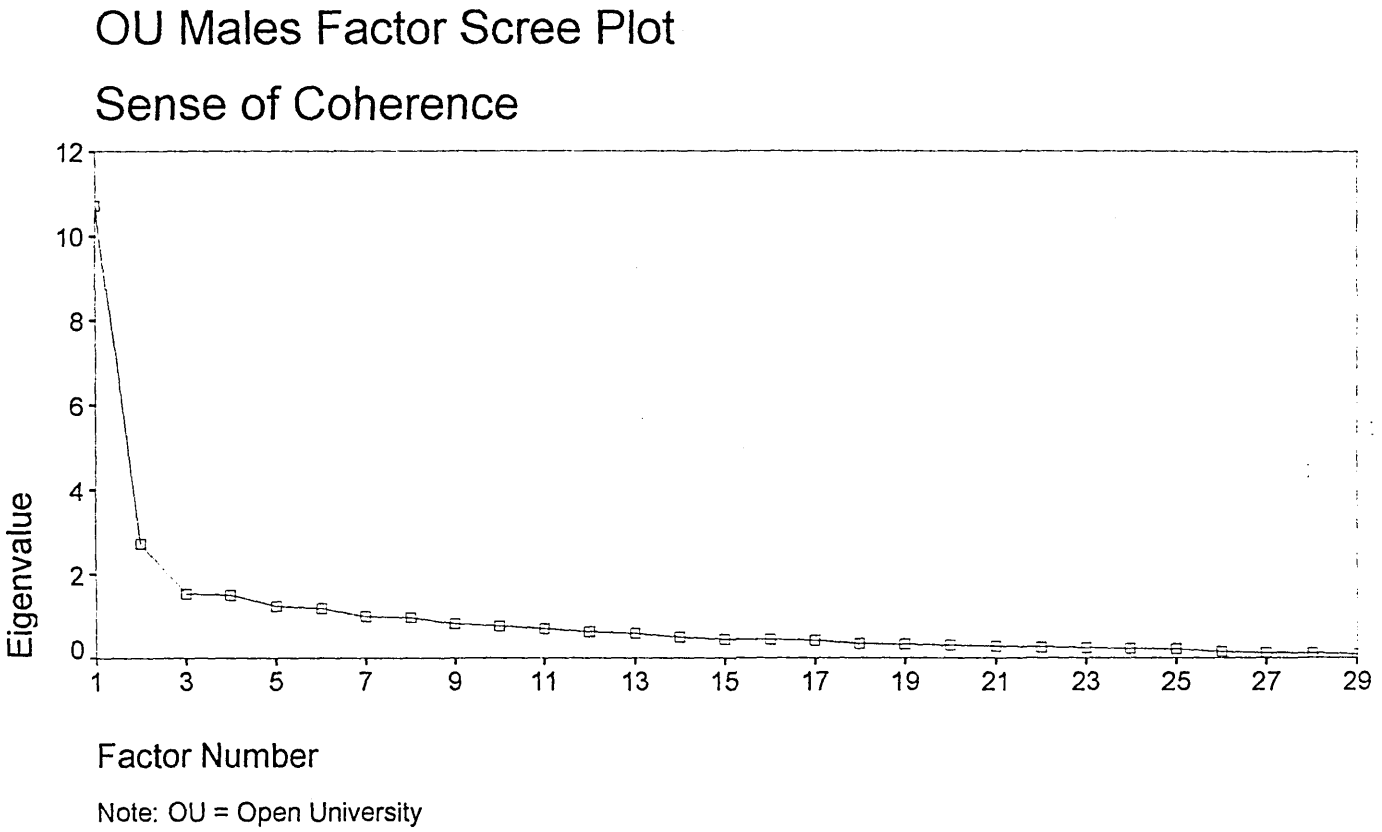
The results of tables 8.3 - 8.6 suggest that certain similarities exist both across and between the sexes. For example the factor "flexibility" although slightly different for each group has several items in common across all samples. The factor "Commitment" overlaps to a certain extent between the Open University female and the Aberdeen male groups and the factor "self efficacy" is similar in both male groups.

Despite these similarities the Dispositional Resilience Scale items have not loaded on the dimensions outlined by Bartone et al. (1989) and has not produced one major factor with which all others are interrelated. There is a lack of consistency across samples once again suggesting the effects of a cohort or / low reliability and validity of the measure.

In the next set of tables the findings from the Exploratory Factor Analysis of the Sense of Coherence Questionnaire for each of the 3 subject groups are reported along with the corresponding screeplots.

Principal Components Analysis with a varimax rotation was used in analysis of the Dispositional Resilience Scale for the Open University male group. Using Kaiser's criterion 6 factors were produced, this was reduced to 2 after examination of the screeplot.

Figure 8.7: Open University Male Group. Screeplot of Exploratory Factor Analysis of Sense of Coherence Questionnaire



Note: OU = Open University

Table 8.7 Open University Male Group. Factors Extracted From Sense of Coherence Questionnaire When Analysed Using Principal Components Analysis with an Orthogonal Rotation Using the Varimax Technique

Table 8.7 (Part 1: Open University Males Factor1 Sense of Coherence

Question No.	Dimension	Factor	Loading
S21	Comprehensibility	1	0.303
S7	Meaningfulness	1	0.806
S8	Meaningfulness	1	0.519
S11	Meaningfulness	1	-.799
S14	Meaningfulness	1	0.739
S16	Meaningfulness	1	0.706
S22	Meaningfulness	1	0.691
S28	Meaningfulness	1	0.7
S6	Manageability	1	0.31
S9	Manageability	1	0.345
S13	Manageability	1	0.47
S18	Manageability	1	0.346
S20	Manageability	1	0.624
S25	Manageability	1	0.556
S27	Manageability	1	0.564

Note: S = Sense of Coherence; (Table continues)

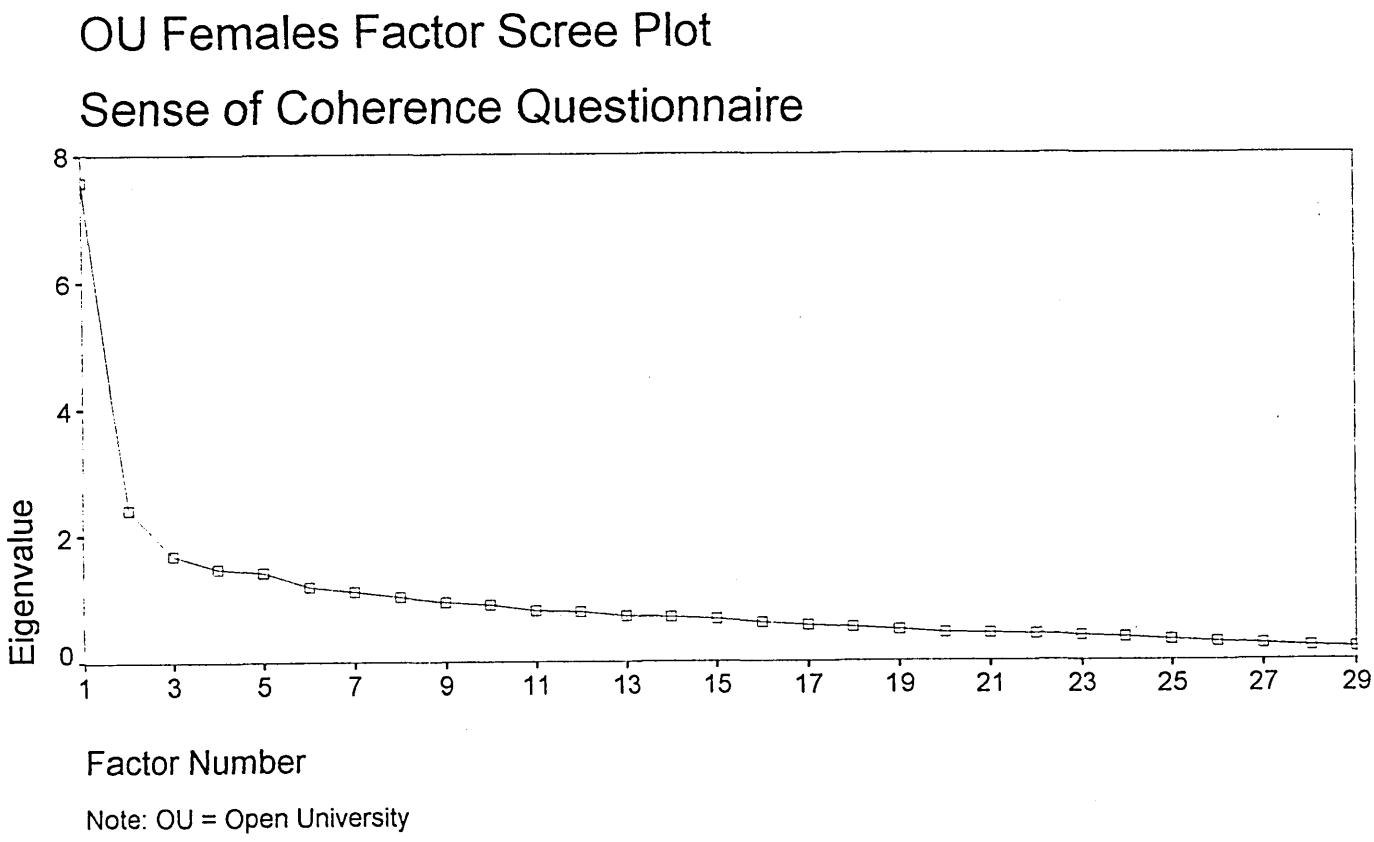
Table 8.7 (Part 2: Open University Males Factor2 Comprehensibility

Question No.	Dimension	Factor	Loading
S1	Comprehensibility	2	0.318
S3	Comprehensibility	2	0.305
S12	Comprehensibility	2	0.677
S15	Comprehensibility	2	0.505
S19	Comprehensibility	2	0.738
S21	Comprehensibility	2	0.639
S24	Comprehensibility	2	0.68
S26	Comprehensibility	2	0.488
S14	Meaningfulness	2	0.374
S22	Meaningfulness	2	0.3
S28	Meaningfulness	2	0.346
S9	Manageability	2	0.47
S18	Manageability	2	0.666
S25	Manageability	2	0.587
S29	Manageability	2	0.694

Note: S = Sense of Coherence;

Principal Components Analysis with a varimax rotation was used in analysis of the Dispositional Resilience Scale for the Open University female group. Using Kaiser's criterion 8 factors were produced, this was reduced to 2 after examination of the screeplot.

Figure 8.8: Open University Female Group. Screeplot of Exploratory Factor Analysis of Sense of Coherence Questionnaire



Note: OU = Open University

Table 8.8 Open University Female Group. Factors Extracted From Sense of Coherence Questionnaire When Analysed Using Principal Components Analysis with an Orthogonal Rotation Using the Varimax Technique

Table 8.8 (Part 1: Open University Females Factor1 Meaningfulness

Question No.	Dimension	Factor	Loading
S19	Comprehensibility	1	0.459
S21	Comprehensibility	1	0.404
S7	Meaningfulness	1	0.723
S8	Meaningfulness	1	0.53
S16	Meaningfulness	1	0.736
S22	Meaningfulness	1	0.532
S28	Meaningfulness	1	0.716
S9	Manageability	1	0.427
S13	Manageability	1	0.429
S20	Manageability	1	0.321
S27	Manageability	1	0.357

Note: S = Sense of Coherence; (Table continues)

Table 8.8 (Part 2: Open University Females Factor2 Comprehensibility

Question No.	Dimension	Factor	Loading
S12	Comprehensibility	2	0.691
S19	Comprehensibility	2	0.552
S21	Comprehensibility	2	0.517
S26	Comprehensibility	2	0.451
S16	Meaningfulness	2	0.386
S9	Manageability	2	0.304
S13	Manageability	2	0.381
S18	Manageability	2	0.739
S29	Manageability	2	0.592

Note: S = Sense of Coherence;

Principal Components Analysis with a varimax rotation was used in analysis of the Dispositional Resilience Scale for the Aberdeen male group. Using Kaiser's criterion 6 factors were produced, this was reduced to 2 after examination of the screeplot.

Figure 8.9: Aberdeen Male Group. Screeplot of Exploratory Factor Analysis of Sense of Coherence Questionnaire

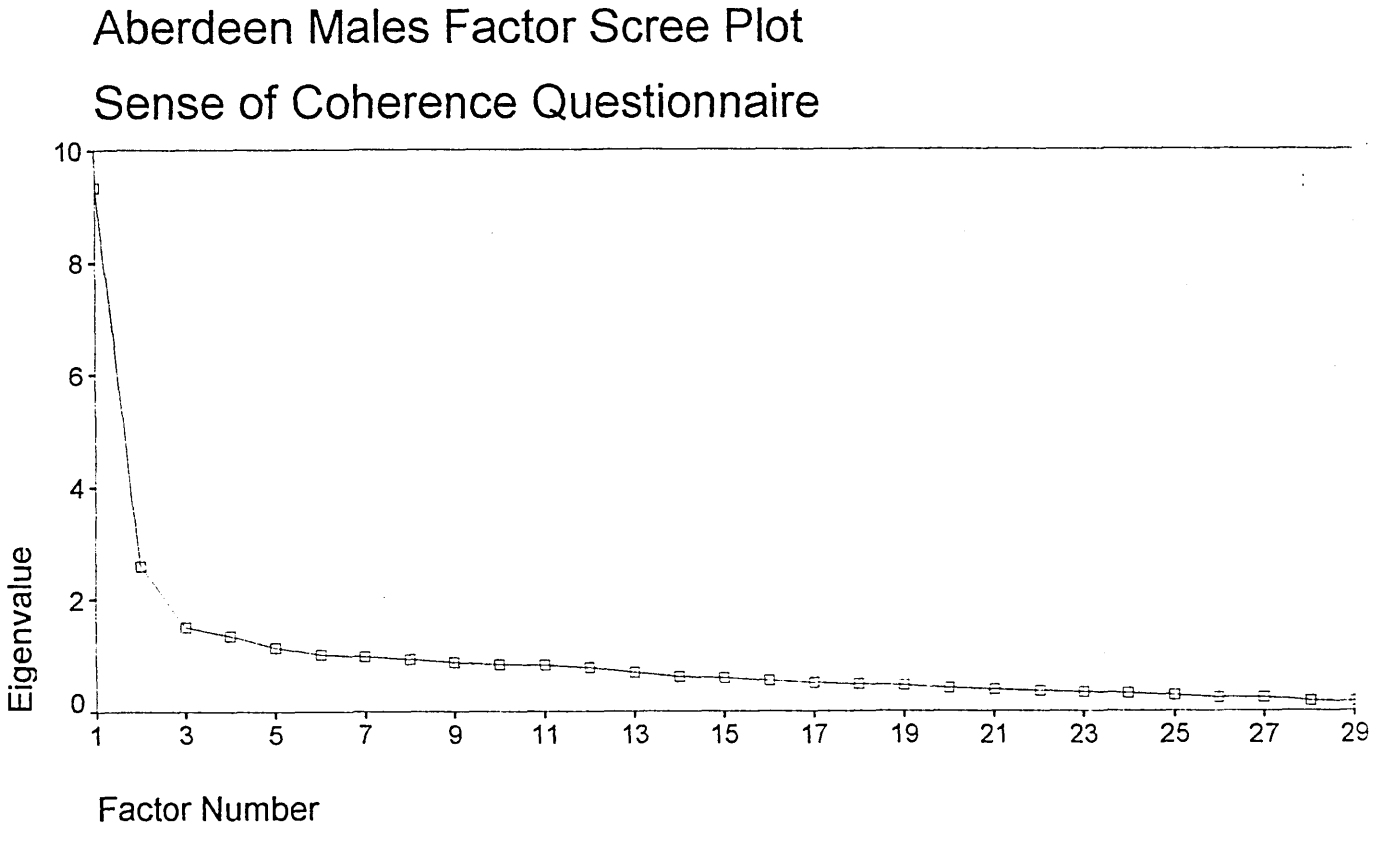


Table 8.9 Aberdeen Male Group. Factors Extracted From Sense of Coherence Questionnaire When Analysed Using Principal Components Analysis with an Orthogonal Rotation Using the Varimax Technique

Table 8.9 (Part 1: Aberdeen Males Factor1 Manageability

Question No.	Dimension	Factor	Loading
S1	Comprehensibility	1	0.316
S12	Comprehensibility	1	0.321
S17	Comprehensibility	1	0.332
S19	Comprehensibility	1	0.594
S21	Comprehensibility	1	0.708
S24	Comprehensibility	1	0.69
S14	Meaningfulness	1	0.421
S22	Meaningfulness	1	0.366
S28	Meaningfulness	1	0.425
S9	Manageability	1	0.596
S13	Manageability	1	0.329
S18	Manageability	1	0.496
S20	Manageability	1	0.453
S25	Manageability	1	0.615
S29	Manageability	1	0.524

Note: S = Sense of Coherence; (Table continues)

Table 8.9 (Part 2: Aberdeen Males Factor2 Meaningfulness

Question No.	Dimension	Factor	Loading
S17	Comprehensibility	2	0.624
S7	Meaningfulness	2	0.651
S11	Meaningfulness	2	- 0.784
S14	Meaningfulness	2	0.553
S22	Meaningfulness	2	0.62
S28	Meaningfulness	2	0.547
S13	Manageability	2	0.603
S20	Manageability	2	0.429
S27	Manageability	2	0.634

Note: S = Sense of Coherence;

Findings suggest a similarity between the factors extracted in the Open University male and female groups, however, the Aberdeen male group appeared to have more emphasis on Comprehensibility in the first factor than either of the other groups and more emphasis on Manageability in the second factor than either of the other groups.

As suggested by the earlier findings in chapter 6 the Sense of Coherence Questionnaire appears to be slightly more consistent across groups than the

Dispositional Resilience Scale but still does not fit the model of 3 interrelated factors contributing to one general factor as outlined by Antonovsky (1987).

8.7 DISCUSSION

The findings from the Confirmatory Factor Analysis in study 4 and the current Exploratory Factor Analysis will now be discussed together followed by a review of the findings across all studies in the research.

The main aim of this final section has been to address a gap in the findings of study 4 (chapter 6). Where the Confirmatory Factor Analysis tested models which were suggested in the literature the current Exploratory Factor Analysis simply observed the relationships which existed between the items without imposing constraints. Findings once again confirm that either there is no certain factor structure in these measures when assessed across groups or that cohort effects are contaminating findings.

8.7.1 JOINT FACTOR ANALYSIS OF THE SENSE OF COHERENCE AND DISPOSITIONAL RESILIENCE SCALE

As it was not possible to assess the Dispositional Resilience Scale and Sense of Coherence Questionnaire together using Confirmatory Factor Analysis this section reflects findings from only the Exploratory Factor Analysis.

After Principal Components Analysis the varimax rotation did not converge suggesting there was no clear pattern of separate factors or underlying constructs beyond that outlined initially.

When analysed together the Dispositional Resilience Scale and Sense of Coherence Questionnaire items appeared to be highly interrelated. This is consistent with the findings of Antonovsky (1987) and supports Stone and Neales' (1984) findings that concurrent assessment of differing coping strategies tends to lead to overlap. It also makes considerable clinical sense that those who have skills of resilience in one area will be more likely to be resilient in parallel areas and vice versa. This makes interpretation of findings more difficult as items may load on the same factor leading to clusters of items due to the central vector representing resilience in various forms. This may not necessarily be indicative of items which can be substituted for each other due to replication and may therefore be misleading on initial inspection.

In order to truly fulfill their roles as coping resource measures associated with mental and physical health, it is necessary to assess the relationship of items on these measures with external criterion. This would aid distinction between the potentially useful aspects of each questionnaire. This might be achieved through application of regression analysis which aims to assess the dependence of one variable on one or more other variables. If, as mentioned earlier, both physical and mental health are related to scores on the Dispositional Resilience Scale and the Sense of Coherence Questionnaire a longitudinal study might be used to assess the extent of this relationship. For example, a study might include a measure of current life events, a state measure of psychological well-being such as the General Health Questionnaire and a physiological measure such as cortisol level and the scores on the health questionnaires. Regression could then assess the extent to which each of these were affected by scores on the Dispositional Resilience Scale and the Sense of Coherence

Questionnaire. Each item on the measures might also be used in the analysis instead of dimension or total scores in order to avoid the current lack of reliability. In this way the relative validity of each item might be assessed in relation to a specific health indicators. This would also provide further evidence beyond the findings of the Wald and Lagrange Multiplier Tests as to which aspects of the questionnaire provided the most valid and useful contributions to the overall model.

Turning now to the individual factors which did emerge in the current analysis there appears to have been some areas of consistency. In both the Open University groups 26 of the 29 items of the Sense of Coherence Questionnaire loaded on the first factor. This finding was not, however, consistent across the Aberdeen male group as less than half of the sense of coherence items loaded on the first factor in this instance. Around half the items from the Dispositional Resilience Scale loaded on the first factor for the Open University groups while once again the Aberdeen male group had far less. Thus although there are certain elements of these constructs in common there is also a considerable amount of variance which they do not share, confirming the findings of study 4. It also appears that there is questionable reliability in what these questionnaires measure.

The subsequent factors in the joint analysis were also lacking in any clarity or consistency which may explain the inability of the varimax rotation to converge. The one aspect of consistency was that several items from the dimension of Challenge tended to load on factors subsequent to the first factor suggesting at least one aspect of hardiness which did not largely overlap with sense of coherence. From examination of the content of these items they appeared to be tapping an aspect of flexibility. For example, items (36) " Changes in routine are interesting to me" and (33) " I like it

when things are uncertain or unpredictable". This is commonly considered to be a problem solving approach linked with health status (Wilson, Christensen, Merrifield, & Guilford, 1975; Nezu & Nezu, 1987) and to be of prime therapeutic importance (Heppner, Reeder, & Larson, 1983).

It is somewhat surprising that the Challenge items account for the majority of the variance in at least one factor for each group. As mentioned earlier in the research Challenge has been considered to be the independent construct in hardiness (Kobasa, in an interview with Wood, 1987) which was unrelated to external health related criteria and offered no additional information to the dimensions of Control and Commitment (Hull et al., 1987). These earlier findings may have reflected the lack of internal consistency of this dimension. Examination of the Challenge items which do not load on the "flexibility" factors suggest that other aspects of coping such as ability for self reflection, (15) " It is exciting to learn something new about myself", may be being tapped. Apart from the theme of flexibility, however, there does not appear to be any consistent aspect of coping which is being assessed through these items. Once again this confirms the findings of the Lagranage Multiplier Test that the majority of Challenge items should not load on the Challenge dimension. The lack of relationship with sense of coherence may be explained as those with a flexible approach to life may by their very nature be more creative and individual and therefore less community reliant or orientated as may be tapped in the Sense of Coherence Questionnaire. As the reliability of the Challenge dimension has been shown to be unacceptably low, however, no firm conclusions can be made from these findings.

Each of the factors subsequent to the initial factor appeared to have a majority of items from one or other of the measures. As these were different for each group of

subjects the lack of clarity once again makes it difficult to make any generalisations about the structure of the measures but highlights the lack of reliability in what is assessed across groups.

It should be noted that the combination of the number of subjects and items in this joint analysis may have had an effect on findings. Child (1970) recommends inclusion of at least 3 subjects for each item to be analysed in factor analysis. This was not possible here while still keeping all subject groups separate. This may be balanced out by the use of a conservative cutoff of 0.3 for loading of an item on a factor as use of an alternative approach such as Burt-Banks (1952) which changes the level of loading considered to be significant across each subsequent factor, would have included many more items in the initial factors.

8.7.2 RESULTS OF CONFIRMATORY AND EXPLORATORY FACTOR ANALYSES OF THE DISPOSITIONAL RESILIENCE SCALE

In study 4 the aim was to use Confirmatory factor Analysis to find the factor solution which, from the empirical models in the literature, best fitted the observed correlations in the sample data. Findings suggested that the model produced by the Dispositional Resilience Scale consistently failed to reach the recommended level of fit (see Bentler, 1989) i.e. the sample data did not produce the model of 3 interrelated factors, with 1 general factor proposed by Bartone et al. (1989). Furthermore, other models of hardiness suggested in the literature were tested but none were found to produce an improved level of fit to that suggested by Bartone et al. (1989).

An Exploratory Factor Analysis was then carried out to assess the structure which would emerge naturally from the current data without the constraints of the earlier analysis. This further demonstrated the inability of this measure to consistently produce 3 factors as 2 of the groups used here had 5 factors while the other had 4 factors. All factors produced consisted of a mix of items from each dimension. If the factors had consisted of a consistent group of items even from various dimensions, this may have been indicative of the interrelation of the factors, however, this was not the case which once again suggested questionable reliability in the measure.

Findings across the subject groups and changes recommended by the Wald and Lagrange Multiplier Tests revealed some inconsistency in response patterns to the measure. Until some level of consistency is achieved it is not possible to make changes to the content of the measure based on the Wald and Lagrange Multiplier Tests. The suggested use of regression analysis in the last section may therefore offer a way forward by pinpointing where alterations may be made in the content of the questionnaire.

In study 4 the Challenge dimension which has been an area of uncertainty throughout the literature on hardiness continued to provide problems. Results suggested that Bartone et al.s'(1989) model would have been improved if all items which made up the Challenge dimension did not load on Challenge. Furthermore the results highlighted that the model would be improved if Challenge did not correlate with Control and Commitment.

When left unconstrained to load on any dimension through the use of Exploratory Factor Analysis, a small group of Challenge items made up the factor "flexibility". This factor also included minimal interrelationship with Commitment and

decision to do this is likely to have meant making some major changes in their lives it is likely that there was some area of dissatisfaction or lack of achievement previously which they were aiming to address. As mentioned in study 3, women, especially those with children are considered to become less happy as life develops in comparison with men (Argyle, 1987). For the working person, frequently the man, the work environment becomes easier and more financially rewarding with promotions while the person at home, frequently the woman, does not experience these benefits with age. This may account for the current female groups' more positive orientation as they have once more taken Control of their situation. It may also explain the similar reports of resilience in comparison with working men

The "self efficacy" factor which has some items in common with "Commitment" is similar for the 2 male groups to a limited extent. This appears to tap the belief that hard work will pay off for both the individual and the larger environment such as the work place. If the female group have been less oriented to the work environment it may be that these types of items have less meaning to them and may therefore be answered less reliably. Although the male Open University group may not be working at present they may still have increased awareness of the work environment on a more recent basis.

It is possible when examining these findings to consider the aims of Bartone et al. (1989) and Antonovsky (1987) in particular, to construct a gender and culturally free measure. This is stated by Antonovsky (1989) but as with so much in the design and application of the hardiness measures no statement is made by Bartone et al. (1989) leaving the implication that it may be applied to any group. In the light of the differences across each group measured in the present studies, the question is raised as

to whether this aim is really too wide reaching and should be narrowed down to a certain group of society to start development of norms. As the measure stands the structures found here in all groups are not consistent with that suggested by Bartone et al. (1989)and as hardiness exists only as a composite of these dimensions it would appear that its very existence, at least with reference to the current data samples, is thrown into question.

8.7.3 RESULTS OF CONFIRMATORY AND EXPLORATORY FACTOR ANALYSIS OF THE SENSE OF COHERENCE QUESTIONNAIRE

In study 4 Confirmatory Factor Analysis revealed that the Sense of Coherence Questionnaire model of 3 interrelated factors with 1 general factor proposed by Antonovsky (1987) came much closer to the Comparative Fit Index level recommended by Bentler (1989) than the models outlined by the authors in relation to the Dispositional Resilience Scale. These findings suggested that with some modification this measure might reach an acceptable level of fit in relation to its theoretical underpinnings and thus provide the link between the empirical and theoretical aspects of the model which would be necessary for clinical use.

When items were left unconstrained to load on any dimension through the use of Exploratory Factor Analysis, the structure of the Sense of Coherence Questionnaire did not, however, resemble that proposed by Antonovsky (1987). Two factors were consistently found across all 3 groups although the extent of overlap between the items in each of these factors varied considerably between the Aberdeen male and Open University groups. These 2 factors accounted for as little as half of the items in the

measure in the female group and left a significant amount unaccounted for in the other groups. The items which remained unaccounted for were spread across all dimensions and showed no particular pattern in their content. This supports the findings of Flannery and Flannery (1990) who report 1 major and 1 minor factor in sense of coherence after principal components analysis with a varimax rotation.

As mentioned earlier the reduction in empirical constraints of the Exploratory Factor Analysis is criticised by some researchers (Kim & Meuuler, 1978) for increasing the likelihood of misinterpretation of results. Even with this criticism in mind the extent of the difference between these findings warrants further validatory evidence. Again this might be achieved through assessment of the relationship of the items on the measure to external criteria to verify the useful properties of the measure. In this way the structure of the model might become evident in an alternative fashion and therefore offer support to one or other of the findings discussed above.

Further inconsistencies with Antonovsky's (1987)model are highlighted by the findings in study 4. Several items which Antonovsky reported as loading on Comprehensibility and Manageability do not do so in any of the 3 samples. It was also clear from the findings of the Exploratory Factor Analysis that the items considered to make up each dimension did not load on factors in these groupings. Similar to the Dispositional Resilience Scale this raises the possibility of extraneous items on the measure which do not positively contribute to the model as outlined in Antonovsky's theory. Meaningfulness, which Antonovsky (1987) describes as the central element of sense of coherence is notably the most accurately defined dimension. Items from this dimension loaded most heavily on the first factor in the Exploratory factor Analysis for both of the Open University groups but not for the Aberdeen male group.

Factor 1 had strong similarities across groups. The Open University male group shared over 90% of the items in factor 1 with the Open University female group. These items were mainly from the dimensions of Meaningfulness and Manageability and as mentioned above the heavier loadings were on the former dimension. In contrast, the Aberdeen male group had equally heavy loadings on Comprehensibility and Manageability. It had a 66% overlap with the other male group although only around 30% overlap with the female group.

The common themes in the Open University groups are about life being fulfilling with goals and purpose. For example, (7) Life is; completely routine (score 1) - full of interest (score 7) ; (16) Doing things you do every day is; a source of deep boredom (score 1)- a source of deep pleasure (score 7). These appear to reflect increased interest in the content of their lives in comparison with the Aberdeen male group. This may be influenced by a lack of flexibility among the working male group to change their environment. They may perceive themselves to be constrained by commitments of finance and family while the Open University groups perceive themselves to be pursuing an area of study which is of interest to themselves and which may offer considerable feelings of interest and achievement.

Unique to the Aberdeen working male group is a set of items about mastery. For example, (12) Do you have the feeling that you are in an unfamiliar situation and don't know what to do ? Very often (score 1) - very seldom (score 7); (17) Your life in the future will probably be ; Full of changes without your knowing what will happen next (score 1) - completely consistent and clear (score 7). This may reflect their current areas of life importance such as the workplace where predictability and control may be of increased significance. This may even reflect the other end of the spectrum

from fulfillment where at least if life is not as interesting and rewarding in one way it is seen as consistent, and within their ability to cope.

Examining the content of the items which loaded on these factors across all groups reveals that among the aspects in common there may be some overlap with Neuroticism. An example of this is (21) " Does it happen that you have feelings inside that you would rather not feel" which concentrates on perception of coping with emotions. It can be seen how this would overlap as the anxious avoidant type of personality with increased Neuroticism would tend to report feeling overwhelmed and vice versa. Alternatively feelings might be seen as referring to physical feelings. In this way, those who are aware of increased heart rate or headache from high blood pressure as they react to stress might answer these this item differently. It will be remembered that in chapter 2 the links between emotional rumination under stress and taking longer to recover a normal heart rate and cortisol level (Roger, 1988, 1998) were discussed, linking the hypothalamic adrenal axis to scores on the health measures. This suggests that whether this item is taken to refer to physical or psychological feelings, the same people may be prone to answer in the same way.

Further areas of overlap are the aspects of optimism such as (22) You anticipate that your personal life in the future will be ; totally without meaning or purpose (score 1) - full of meaning or purpose (score 7), and perception of Manageability in various other areas of life which make up the remaining areas of overlap. As the factor appears to be tapping various aspects of sense of coherence in its common areas it has been named "sense of coherence".

In the second factor revealed by Exploratory Factor Analysis there is minimal overlap between the Open University groups and the Aberdeen male group although

the university groups themselves do have an over 70% overlap with each other. The types of items which make up the Open University overlap appear to focus on dealing with feelings, not becoming overwhelmed and ruminating on upsetting events. For example, (19) Do you have mixed up feelings and ideas ? Very often (score 1) - very seldom or never (score 7). As discussed in study 4 these areas in common may reflect a cohort effect that the Open University group are more ego developed and therefore both sexes are more in tune with their perception of feelings in comparison with working male group.

Overall there is little clarity in the dimensions across subject groups in the Sense of Coherence Questionnaire and recommended changes are inconsistent. Results in study 4 suggest different changes for each subject group. For example, to achieve the best model fit in relation to the female group Comprehensibility should not correlate with either Manageability or Meaningfulness, for the Open University male group, Comprehensibility should not correlate with Meaningfulness and for the Aberdeen male group Comprehensibility should not correlate with Manageability. Once again this suggest inconsistency is what is being measured or cohort effects.

Findings in study 4 which supported of Antonovsky's theory were that the correlation of Manageability and Meaningfulness contributes to the goodness of fit in this model across all samples. The theory of a general factor across all samples is also supported to only a limited extent as certain items may not be loading on the factors suggested by Antonovsky (1987). This is confirmed in both studies. Despite the similarities across the groups there is still enough difference to have resulted in the lack of reliability described in study 4.

8.7.4 SEX DIFFERENCES IN SCORING

The addition of a further male subject group has highlighted the possibility that the sex differences found in study 3 may have simply been group differences as in several instances each of the three groups assessed here have provided different results. This is can be seen in the example reported above in section 8.7.5 where improvement of the sense of coherence model across each group recommended different changes in each case.

8.7.5 VARIANCE ACCOUNTED FOR BY PERSONALITY AND PSYCHOLOGICAL WELL-BEING

As neither the Sense of Coherence or Dispositional Resilience Scale models were found accurate enough to meet the criteria set out by Bentler (1989) it was not possible to include scores on personality and the General Health Questionnaire in a Confirmatory Factor Analysis. The contribution of personality and psychological well-being to the model was not therefore assessed in study 4. It is possible that as discussed above this may be included in a regression analysis in future studies in order to assess external criterion related validity for individual items in the Sense of Coherence Questionnaire or Dispositional Resilience Scale.

8.7.6 RELIABILITY

Findings in study 4 suggest that the internal consistency of the Sense of Coherence dimensions (Cronbach's Alpha) are somewhat higher than those of the Dispositional Resilience Scale. This reflects increased homogeneity of items but does

not necessarily imply that the homogenous group is validly measuring what it claims to measure.

In the Dispositional Resilience Scale Commitment appears most internally consistent with the female group having low scores on both Control and Challenge. The higher internal consistency on the total scores reflects the increased number of items included in the calculation and should not be interpreted as evidence of unitary constructs. It was proposed in the current study that this lack of consistency might reflect either a lack of reliability in the item groupings such as those discussed above in relation to the Challenge dimension or a mix of state and trait items on the measures. This latter problem might lead to a lack of clarity in interpretation of items. For example, (1) Most of my life gets spent doing things which are worthwhile. This might refer to their perception of recent day to day life when the person has had a particularly bad year. In general over a lifetime they may feel quite satisfied about things being worthwhile but it is unclear how they will respond causing a potential mix of state and trait replies.

The lack of reliability among the dimensions is a major issue as without the ability to be consistent in what they measure it is impossible to assess validity and thus throws into question any further exploration of their relationship to external validators unless it is carried out item by item and replicated across a number of groups. It also casts severe doubt on the existence of sense of coherence and hardiness as constructs, at least with reference to the current sample and limits the reliability of using these measures across populations.

8.7.7 VALIDITY

Findings in the Confirmatory Factor Analysis suggest that construct validity is better for the Sense of Coherence Questionnaire than the Dispositional Resilience Scale although the Exploratory Factor Analysis casts doubt on the construct validity of both measures. This may have been affected the lack of reliability of the individual items and also the possibility of personality elements confounding the findings. It is however, suggested that consideration of personality as mediating variables in coping and health does not necessarily render the measures under investigation as redundant. It would appear more empowering to a client to view their coping strategies as a series of strengths and needs which they have a chance to alter rather than characterising the problem as a personality difficulty which are so often construed as untreatable.

In the final section the findings and developments across the studies which make up the current research will be reviewed. Areas where improvements might be made are discussed and suggestions are made for future research.

Chapter 9

CONTENTS

CHAPTER 9

9.1 SUMMARY OF FINDINGS FROM STUDIES 1 - 4

9.1.1 BACKGROUND

The initial aim of this research was to investigate the clinical utility and validity of 2 measures, the Sense of Coherence Questionnaire and the Dispositional Resilience Scale. These appeared from the available literature to provide a parallel development with the medical model in enabling attention to prophylactic care and consideration of clients in a more holistic manner. In order to be clinically useful a need was identified to provide a link between the theoretical models of Sense of Coherence and Hardiness and empirical practice. If found to be reliable and valid these measures aimed to fill this gap.

9.2 MAIN THEMES OF THE RESEARCH

9.2.1 INTERRELATIONSHIP OF SENSE OF COHERENCE QUESTIONNAIRE AND DISPOSITIONAL RESILIENCE SCALE

Within the measures themselves several areas of uncertainty began to emerge as the literature was investigated in greater depth. It was unclear to what extent covariance existed between the measures and whether indeed the presence of covariance would indicate that one or other of the measures was redundant. Results from the initial studies suggested interrelation between the total scores of the

measures and to a lesser extent some overlap between the dimensions raising questions about construct validity.

Further investigation produced more complex results and made interpretation more difficult. Results from the Exploratory Factor Analyses for example, suggested on initial inspection that the measures were largely interrelated with many items from each measure loading on the first factor. It was also noted, however, that the grouping of these items around one central factor may have indicated a common theme of resilience without suggesting that all items measured exactly the same aspects of coping or that some of the items may be redundant. Further evidence of replicability of structure i.e. reliability and construct validity are needed along with external validity before coming to any conclusions about this issue and this was highlighted as an area for future research.

Beyond the area of overlap were additional factors which consisted of items from a mix of dimensions across both measures. In most cases these changed for each subject group suggesting low reliability and thus validity of the measures across subjects groups. The implications of this for clinical utility are that the measures do not, as the literature implies (Antonovsky, 1987, Bartone et al., 1989) reliably provide a predictive measure of resilience regardless of who completes them. Areas which appeared to have more consistency were for example, the factor of "flexibility". This consisted of a small group of Challenge items and appeared to account for some of the variance in the Dispositional Resilience Scale across all groups. It was also unrelated to the initial factor which may explain some of the criticisms on lack of construct validity of this dimension which occur in the literature (e.g. Kobasa in an interview with Wood, 1987).

9.2.2 CRITERION RELATED VALIDITY

With reference to the Dispositional Resilience Scale in particular there appeared to be a lack of external criterion related validity in the literature. The General Health Questionnaire was selected as a widely used clinical measure of psychological well-being which might be used to test concurrent validity. In the light of the claims by both Antonovsky (1992) and Bartone et al. (1989) that these measures were predictively related to psychological and physical well-being, it was hypothesised that scores on the Sense of Coherence Questionnaire and the Dispositional Resilience Scale would be negatively related to scores on the General Health Questionnaire (which are higher for those with psychological difficulties).

Although the current research did not aim to assess the physiological aspects of resilience these were also discussed. The current studies covered the psychosocial and health aspects of Keller et al.s' (1994) 3 part model of stress, the third aspect of this being immunologic change. The hypothalamic adrenal axis was also discussed as being one of the most likely mechanisms to link cognitive appraisal of a situation with physical symptomatology (Forbes and Roger, 1999). Roger (1988, 1998) suggested that those who ruminate about upsetting events, presumably a group who believe that they are less able to cope, take longer to recover normal heart rate and cortisol level putting them at increased risk of physical pathology. It was suggested that as scores on the health measures assess perception of resilience these might be related to cortisol level and the time which it takes for normal heart rate to be regained after exposure to stress. Again this was highlighted as a potential area for future research.

The negative relationship of scores on the General Health Questionnaire with scores on the Sense of Coherence Questionnaire and the Dispositional Resilience Scale was supported in the pilot study, however, as findings developed over the subsequent studies, it was considered that Neuroticism may be a confounding element in this relationship. The question of whether the Sense of Coherence Questionnaire and the Dispositional Resilience Scale provided any new or useful information over and above existing measures such as the Eysenck Personality Inventory therefore became even more salient.

9.2.3 DISCRIMINANT VALIDITY

The possibility that both sense of coherence and hardiness are related to neuroticism was investigated. This was partially supported in the pilot study and second study as Sense of Coherence was highly correlated with Neuroticism in both instances. Scores on the Dispositional Resilience Scale, however, were unrelated in the pilot study and only significantly related at 99% certainty level in the second study before Bonferroni correction. As mentioned above further refinement lead to the hypothesis that personality may be a confounding variable in the measurement of these constructs. The Dispositional Resilience Scale was still considered within this hypothesis as it was not clear if the small number of subjects in study 2 may have resulted in the non significant relationship between Neuroticism and Hardiness and replication was implicated.

Investigating this further, it was considered that the confounding effects of Neuroticism as outlined in the pilot study and study 1 may be affected by sex differences. Differences in scoring were found between males and females in the

group with lower scores on this personality trait as outlined in study 3. It appeared possible that the presence or absence of certain coping styles might co-occur with certain personality characteristics and that sex differences may be present in either the coping styles, the personality characteristics or both. An example of this might be that as women tend to report increased levels of anxiety and emotionality (Strongman, 1987) this may result in higher scores on Neuroticism. In this case even at the lower end of the scoring scale women will tend to have significantly higher scores on Neuroticism than men. As increased Neuroticism is linked with emotionally focused coping and avoidance (Vollrath, Torgersen & Alnaes, 1995) which are considered to be maladaptive this may lead to differences in coping styles and effectiveness among the 2 groups.

The issue of how the potential confound of Neuroticism should be construed was raised in study 4. It was proposed that many aspects of behaviour which covary with certain personality characteristics may be seen as adaptive or maladaptive coping. Conceptualising behaviour and cognitions in this way appeared to offer the client more options and empowerment to change than would labeling them as having a specific personality characteristic which was in some way disabling. Thus, even though the measures may be confounded with Neuroticism, investigation of the dimensions which might coexist with this trait could provide useful clinical information. Beidel and Turner (1998) for example describe clients with Avoidant Personality Disorder as exhibiting increased social phobia, anxiety, depression and lower social functioning. By investigating beyond the initial personality label they were able to develop input to improve social functioning and thus reduce the effects of the Avoidant Personality Disorder.

From this example above it is evident that it cannot be assumed without further investigation, that each person with a certain level of score on Neuroticism will display exactly the same range of strengths and needs in their coping strategies. If the measures under investigation are therefore able, after future modification, to highlight that for example, Comprehensibility or Challenge are issues where people have needs it may be possible to provide information over and above that of the Eysenck Personality Inventory.

Findings in relation to Extroversion have been inconsistent throughout the research. It was found to be positively correlated with scores on the Dispositional Resilience Scale in the pilot study (mainly female) and the female group in study 4. Findings in relation to the male groups are also inconsistent as it is correlated with the scores on the General Health Questionnaire for the Open University male group in study 4 but not correlated with Hardiness. In the Aberdeen male group it is not correlated with either scores on the General Health Questionnaire or Hardiness. These findings might suggest that the role of Extroversion is different for men and women again coming back to the need for further investigation into sex differences in coping resources. Once again cohort effects must be considered as a potential extraneous variable.

Extroversion had not been linked with either sense of coherence or hardiness in any previous literature, however, Gray's (1981) theory appears to offer some support for the relationship with psychological well-being. As mentioned earlier it was found that those with increased extroversion scores are more easily and effectively conditioned with positive reinforcement while those who are more introverted will be more strongly conditioned by the chance of negative reinforcement. It would therefore be expected that those with increased scores on

extroversion would tend to approach a problem in an attempt to master it, as opposed to avoiding it and in this way would increase their perception of coping thus affecting scores on the questionnaires under investigation.

Why Extroversion does not correlate consistently with Sense of Coherence is unclear. As the Sense of Coherence Questionnaire is less concerned with individual Control than the Dispositional Resilience Scale and more concerned with communal support, this may explain some of the difference in the interrelationship. It is more likely for example that the Open University female group will need to have high individual coping skills as much of their study is done alone although this will not preclude them from also having good social networks. Therefore they may have scores on both the Dispositional Resilience Scale and Sense of Coherence Questionnaire which correlate with psychological well-being. The women in the "day" university group may be more inclined to make use of social networks as they are immediately available on a daily basis. In this way perception of coping in the latter group may be more centred around group coping explaining the differences in scoring on the questionnaires. Alternatively the age differences between the groups or some other variation may gives rise to a cohort effect.

9.2.4 COHORT EFFECTS

Due to the Sense of Coherence Questionnaire being based on trauma survivors and the Dispositional Resilience Scale being based on a modified version of the Unabridged Hardiness Scale which was developed around male executives the possibility of cohort effects was considered as an error variable in the design of the measures. This may have been further confounded by the heterogeneous samples used

in this research and have contributed to the lack of reliability in findings which has been evident across all studies. For example, the age range of the Open University were somewhat older and presumably at different life stages than the day university students. This may have affected their perception of coping in various situations. Also the use of voluntary attendance at class to fill in the measures among the day university students and postal return for the Aberdeen working male group may have resulted in an over inclusion of highly motivated people.

It was hypothesised that age differences might affect personal coping resources, however, this was not supported in any of the studies. The need for longitudinal research was highlighted in order to more effectively investigate this issue.

9.2.5 SEX DIFFERENCES IN SCORING

Finally, it was hypothesised that sex differences may be evident in personal coping. This was confirmed by study 3 where non-linear relationships were found in coping in conjunction with personality. Total scores on both neuroticism and Meaningfulness were found to be higher for the female group but this was not significant after Bonferroni correction. Earlier findings suggested that females tend to score more highly on neuroticism and to have increased concern with interpersonal issues, which are more highly reflected in the Meaningfulness questions, versus those of Control (Gjerde, 1995; Margalit & Eysenck, 1990; Gilligan, 1982). It was therefore noted as an area for further research in order to avoid the potential for Type II errors.

Gender differences were found to exist in the subsets of scores obtained from the Sense of Coherence Questionnaire and Dispositional Resilience Scale, personality

traits, and their relationship to psychological health. The most notable is that of the sex differences in the group with low scores on neuroticism where as mentioned above the scores for the Sense of Coherence Questionnaire only in the female group and the Dispositional Resilience Scale only in the male group (at 99% certainty which was not significant after Bonferroni Correction), correlated with psychological health. Again the male group findings are mentioned in order to avoid the potential for Type II errors occurring. This raised the possibility that consideration of sex differences may be of importance in interpretation of these scores and that normative data is needed. Both the size of the male group and cohort effect may have biased these findings. Subsequent findings in study 4 that each subject group (2 male, 1 female) had differing results in many areas, further confirmed the need for clarification in the area of sex differences versus cohort effects.

9.2.6 ARE THE QUESTIONNAIRES VALID AND USEFUL FOR CLINICAL PRACTICE

In their current format it would not appear possible to employ either the Dispositional Resilience Scale or the Sense of Coherence Questionnaire to aid in clinical decision making. The studies in the current research have highlighted areas of difficulty in the lack of reliability both within the measures and across groups. There appears to be considerable overlap in what is measured by the 2 questionnaires but a lack of clarity in the areas of distinction for each and a large amount of variance for which no account is made. There are also gaps in construct validity and consequently evidence in both the literature and current studies which have examined criterion

related validity becomes questionable. Methodological issues and recommendations for future research will now be discussed.

9.3 METHODOLOGICAL ISSUES AND RECOMMENDATIONS FOR FUTURE RESEARCH

As these findings are based on cross-sectional studies and modest sample sizes results should be interpreted with this in mind. It is possible for example, that they may represent a cohort or situational effect and the questionnaires may be assessing a largely state aspect of coping.

In order to improve available information on these measures, a longitudinal study is implicated to assess the consistency over time of the scores as opposed to a cross-sectional assessment of concurrent validity. Age and sex differences which are highlighted in the current research as potentially accounting for variance in the measures remain questionable until followed up over time, again due to the potential of cohort effects in the current studies.

The aims of Antonovsky (1987) and Bartone et al.(1989) to produce measures which are not specific to one population in particular are also questioned. It may be necessary to refine the measures in one area before moving into others and developing norms. Without this approach the measures may continue as at present to be used without further refinement and development and to produce consistently erroneous results upon which clinical and occupational decisions are made.

As discussed after study 4 and the additional Exploratory Factor Analysis study, findings suggest lack of consistency in reliability and in validity of both measures. One area raised as a potential advance on the current studies was to assess

the external criterion related validity using regression analysis. This might pinpoint some of the variance which so far remains unaccounted for in both the Sense of Coherence Questionnaire and the Dispositional Resilience Scale . In conjunction with findings from a Confirmatory Factor Analysis, Wald and Lagrange Multiplier tests it might also provide a guide to areas were changes could be implemented in the measures. It was discussed that individual items as well as dimensions and total scores might have their relationship with psychological health measured through use of the General Health Questionnaire and their relationship with physical health assessed through use of a physiological measure such a cortisol level. Findings in this area might provide a more integrated model of these elements as proposed by Keller et al. (1994) in relation to psychoneuroimmunology.

It should be noted however that with the overlap between these measures the problem of multicolinearity may occur. This happens when large numbers of independent variables fit equally well on the dependent variable. In this situation for example the dimensions of Commitment and Control may fit equally well on the General Health Questionnaire. This can result from covariance among constructs, from covariance among measuring techniques, from both these things or due to some other error. It is therefore clear that this problem already exists with the current data. Tests of regression do tend to take multicolinearity into account automatically, however, it is not possible to say that one particular variable is significant or not without discussing each of the others involved making interpretation more complex.

The lack of male subjects has been a problem in all but the last section of the research and has consequently left gaps in the findings. This is noted as an area for follow-up.

The current research did not examine test retest reliability which is also of importance in order to assess whether the questionnaires are able to demonstrate consistency of measurement over time.

Ethics preclude manipulation of peoples' experiences of life events to create an experimental condition, as opposed to using correlational research. In order to make best use of this type of research longitudinally, measures of life stressors which occur in parallel might be taken. Measures which might provided concurrent validity from adaptive coping strategies might also be used longitudinally. These could included for example, metacognition, which Brown and Deloache (1978) describe as planning, checking and monitoring. This is considered to be an important part of problem solving, which is linked with mental health (Nezu 1985) and dovetails with the earlier coping resource of detachment (Roger & Nash, 1995) which includes strategy and planning. Other coping resources which are known to influence psychological health may provide external criterion related validity. These might include; self esteem (Teasdale & Dent, 1987), self efficacy (Lightsey, 1996), aspects of problem solving (Friedman, 1991) and cognitive behavioural self management (Padesky & Moon, 1998), gender (Nolen-Hoeksema, 1987), attributions (Beck et al., 1979), environmental factors (Feingold, 1994), genetic inheritance (Zuckerman, 1991) and social support (Argyle, 1987).

As the General Health Questionnaire which measures psychological well-being without breaking it down into specific strengths or disorders, was used here, use of questionnaires which assess specific coping strategies and disorders such as depression and anxiety may further clarify the relationship of these measures to the continuum of psychological health. For the time being however it does not appear that either the Sense of Coherence Questionnaire or the Dispositional Resilience Scale

should be used to make clinical or occupational decisions due to the questionable validity of the measures as they stand.

References

ALLRED, K.D., & SMITH, T.W. (1989) The hardy personality: cognitive and physiological responses to evaluate threat. Journal of Personality and Social Psychology,56, 257-266.

AMELANG, M., SCHMIDT-RATHJENS, C. & MATTHEWS, G. (1996) Personality, cancer and coronary heart disease: Further evidence on a controversial issue. British Journal of Health Psychology, 1, 191-205.

AMIRKHAM, J.H. (1990) A factor analytically derived measure of coping: The Coping Strategy Indicator. Journal of Personality and Social Psychology, 59, 1066-1074.

AMSEL, R. & FICHTEN, C.S. (1998) Recommendations for self-statement inventories: Use of valence, end points, frequency, and relative frequency. Cognitive Therapy, 22, 255-277.

ANASTASI, A. (1990) Psychological testing (6th ed.) New York: Macmillan Publishing.

ANSON, O., CARMEL, S., LEVENSON, A., BONNEH, D.Y. & MOAZ, B. (1993) Coping with recent life events : The interplay of personal and collective resources. Behavioural Medicine, 18, 159-166.

ANSON, O., PARAN, E., NEUMANN, L., & CHERNICHOVSKY, D. (1993) Gender differences in health perceptions and their predictors. Social Science and Medicine, 36, 419-427.

ANTONOVSKY, A. (1974) Conceptual and methodological problems in the study of

resistance resources and stressful life events. In B. S. Dohrenwend and B.P. Dohrenwend (Eds.) Stressful life events: Their nature and effects. New York: Wiley.

ANTONOVSKY, A. (1987) Unravelling the mystery of health. San Francisco,CA: Jossey-Bass Inc.

ANTONOVSKY, A. (1993) The structure and properties of the sense of coherence scale. Social Science and Medicine,36, 725-733.

ANTONOVSKY, A., ADLER, I., SAGY, S. & VISEL, R. (1990) Attitudes towards retirement in an Israeli cohort. International Journal of Aging and Human Development, 31, 57-77.

ANTONOVSKY, H. (1985) The development of a sense of coherence and its impact on responses to stress situations. Journal Of Social Psychology,126, 213-255.

ANTONOVSKY, H., HANKIN, Y., & STONE, D. (1987) Patterns of drinking in a small development town in Israel. British Journal of Addictions, 82, 293-303.

ANTONOVSKY, H., & SAGY, S. (1986) The development of a sense of coherence and its impact on responses to stress situations. Journal of Social Psychology,126, 213-225.

ARGYLE, M. (1987) The Psychology Of Happiness. London: Methuen & Co. Ltd.

ASHTON, H. (1984) Benzodiazepine withdrawal: An unfinished story. British Medical Journal, 288, 1135-1140.

ASHTON, H. & GOLDING, J.F. (1989) Tranquilizers: Prevalence, predictors, and possible consequences. Data from a large United Kingdom survey. British

Journal of Addiction, 84, 541-546.

AVILA, C., MOLTO, J., SEGARA, P. & TORRUBIA, R. (1995) Sensitivity to conditioned or unconditioned stimuli: What is the mechanism underlying passive avoidance deficits in extraverts. Journal of Research in Personality, 29, 373-394.

BANDURA, A. (1977a) Social Learning Theory. Englewood Cliffs, N.J.: Prentice-Hall.

BANDURA, A. (1977b) Self efficacy : Toward a unifying theory of behavioural change. Psychological Review,84, 191-215.

BANDURA, B. (1991) Health promotion for chronically ill people in B. Bandura and I. Kickbusch (Eds.) Health Promotion Research. Towards a New Social Epidemiology. World Health Oraganisation Regional Publications, European Series No. 37.

BARNETT, P.A., & GOTLIB, I.H. (1988). Psychosocial functioning and depression: Distinguishing among antecedents, concomitants, and consequences. Psychological Bulletin, 104, 97-126.

BARTONE, P.T.,URSANO, R., WRIGHT, K. & INGRAHAM, L. (1989) The impact of military air disaster on the health of assistance workers. Journal of Nervous and Mental Disease,177, 317-328.

BECK, A.T., RUSH, A.J., SHAW, B.F., & EMERY, G. (1979) Cognitive therapy of depression. Chichester : John Wiley & Sons, .

BECK, A.T., RUSH, A.J., SHAW, B.F., & EMERY, G. (1983) Cognitive therapy of depression. New York: Guilford Press.

BECK, A.T., WEISSMAN, A., LESTER, D., & TREXLER, L. (1974). The measurement of pessimism: The hopelessness scale. Journal of Consulting and Clinical Psychology, 42, 861-865.

BEE, H. (1994) Lifespan development. New York: Harper Collins College Publishers.

BEEL, C., HOPSON, B. & SCALLY, M. (1991) Assertiveness a positive process. London: Gold Arrow Publications.

BEIDEL, D.C. & TURNER, S.M. (1998) Shy Children Phobic Adults. Nature and Treatment of Phobic Adults. Washington, DC: American Psychological Association.

BENGSTON, V., ROSENTHAL, C. & BURTON, L. (1990) Families and aging: Diversity and heterogeniety. In R.H. Binstock & L.K. George (Eds.) Handbook of aging and social sciences (3r ed.) San Diego: Academic Press.

BENTLER, P.M. (1989) EQS Structural Equations Program Manual. Los Angeles, CA: BMDP Statisitcal Software Inc.

BENTLER, P.M. (1990) Comparative fit indexes in structural models. Psycholgical Bulletin, 107, 238 - 246.

BENTLER, P.M. & BONNET, D.G. (1980) Significance tests and goodness of fit in the analysis of covariance structures. Psychological Bulletin, 88, 588 - 606.

BERNSTEIN, J. & CARMEL, S. (1991) Gender differences over time in medical school stressors, anxiety and the sense of coherence. Sex Roles, 24, 335-344.

BLACKBURN, I.M. (1992) Coping with depression. Edinburgh: Chambers.

BLOCK, J.H. (1973) Conceptions of sex-role: Some cross-cultural and longitudinal perspectives. American Psychologist,28, 512-526.

BLOCK, J.H., GJERDE, P.F., BLOCK, J.H. (1991) Personality antecedents of depressive tendencies in 18-year-olds: A prospective study. Journal of Personality and Social Psychology,60, 726-738.

BONE, M.R., BEBBINGTON, A.C., JAGGER, C., MORGAN, K. & NICOLAAS, G. (1995) Health Expectancy and Its Uses. HMSO, Department of Health Publication.

BOWLBY, J. (1988) A secure base. New York: Basic Books.

BOWMAN, B. (1996) Cross-cultural validation of Antonovsky's Sense of Coherence Scale. Journal of Clinical Psychology, 52, 547-549.

BREAKWELL, G.M., HAMMOND, S., & FIFE-SCHAW, C. (1995) (Eds) Research methods in psychology. SAGE Publications Ltd : London.

BREWIN, C.R. (1988) Cognitive Foundations of Clincial Psychology. Hove: Lawrence Erlbaum.

BROWN, A.L. & DeLOACHE, J.S. (1978) Skills, Plans And Self Regulation. In R.S. Siegler (Ed.) Childrens thinking : What develops ? (3 - 35) Hillsdale, N.J. Lawrence Erlbaum Assoc.

BROWN, J. (1985) An introduction to the uses of facet theory in D.V. Canter (Ed.) Facet theory: Approaches to social research. New York: Springer-Verlag.

BROWN, A.L. (1987). Metacognition, executive control, self-regulation, and other more mysterious mechanisms. In F.E. Weinert, & R.H. Kluwe (Eds.), Metacognition, motivation, and understanding. (pp 65 - 116). Hillsdale, NJ: Erlbaum.

BURNS, R.B. (1979) The self concept. theory, measurement , development and behaviour. New York: Longman Group Ltd.

BURSIK, K. (1995) Gender-related persoanlity traits and ego development: differential patterns for men and women. Sex Roles, 32, 601-615.

BURT, C. (1952) Tests of significance in factor studies. British Journal of Psychology,5, 109-133.

BUTTON, E.J., SONUGA-BARKE, E.J.S., DAVIES, J. & THOMPSON, M. (1996) A prospective study of self-esteem in the prediction of eating problems in adolescent schoolgirls: Questionnaire findings. British Journal of Clinical Psychology,35, 193-203.

BYRNE, B. M. (1994) Structural Equation Modelling With EQS And EQS / Windows. Thousand Oaks, CA: Sage Publications.

CAMPBELL, J.M., AMERIKANER, M., SWANK, P., & VINCENT, K. (1989) The relationship between the Hardiness Test and the Personal Orientation Inventory. Journal of Research in Personality, 23, 373-380.

CARLSON, N. R. (1994) Physiology of behaviour, (5th ed.) London: Allyn and Bacon.

CARMEL, S., ANSON, O., LEVENSON, A., BONNEH, D.Y. AND MOAZ, B. (1991) Life events, sense of coherence and health: Gender differences on the kubbutz. Social Science and Medicine, 32, 1089-1096.

CARMEL, S., & BERNSTEIN, J. (1989) Trait-anxiety and sense of coherence: a longitudinal study. Psychological Reports,65, 221-222.

CARVER, C.S. (1989) How should multifaceted personality personality constructs be tested? Issues illustrated by self-monitoring, attributional style and hardiness. Journal of Personality and Social Psychology, 65, 577-585.

CASEY, P. (1990) Screening and detection of psychiatric illness in D. F. Peck and C.M. Shapiro, Measuring Human Problems. Chichester : John Wiley & Sons.

CASSEL, J. (1974) Psychological processes and stress: Theoretical formulation. International Journal of Health Services,4, 471-482.

CASSIDY, T. & LONG, C. (1996) Problem-solving style, stress and psychological illness: Development of a multifactorial measure. British Journal of Clinical Psychology,35, 265-277.

CATTELL, R.B. (1966) The scree test for the number of factors. Multivariate Behavioural Research, 1, 245-276.

CHILD, D. (1970) The essentials of factor analysis. London: Holt, Rinehart & Winston, .

CLARKE, D.E. (1995) Vulnerability to stress as a function of age, sex, locus of control, hardiness and Type A personality. Social Behaviour and Personality, 23, 285-286.

COCHRANE, D. (1972) The measurement of ill health. International Journal Of Epidemiology, 1, 92 - 98.

COCKERHAM, W.C. (1981) Sociology of Mental Disorder. Englewood Cliffs, NJ: Prentice-Hall.

COE, R.M., ROMEIS, J.C., TANG, B. & WOLINSKY, F.D. (1990) Correlates of a measure of coping in older veterans: A preliminary report. Journal of Community Health, 15, 287-296.

COLE, D. (1987) Methodological contributions to clinical research. Utility of confirmatory factor analysis in test validation research. Journal of Consulting and Clinical Psychology, 55, 584-594.

COMPTON, W.C., SEEMAN, J., & NORRIS, R.C. (1991) Predicting hardiness: A search for the parameters of deep cognitive structures. Medical Psychotherapy An International Journal,4, 121-129.

CONTE, H.R., PLUTCHIK, R., PICARD, S. & BUCK, L. (1996) Gender differences in recalled parental childrearing behaviours and adult self-esteem. Comprehensive , Psychitary, 37, 157-166.

COSTA, P.T., Jr., & McCRAE, R.R. (1985) The NEO personality inventory manual. Odessa, FL: Psychological Assessment Resources.

COSTA, P.T., Jr., & McCRAE, R.R. (1987) Neuroticism, somatic complaints, and disease: Is the bark worse than the bite? Journal of Personality,55, 299-316.

DAHLIN, L., CEDERBLAD, M., ANTONOVSKY, A., & HAGNELL, O. (1990) Childhood vulnerability and adult invincibility. Acta Psychiatr Scand, 82, 228-232.

DALTON, P. & DUNNETT, G.(1989) A Psychology for Living. Personal Construct Theory for Professionals and Clients. London : Dunton Publishing.

DANA, R.H., HOFFMAN, T., ARMSTRONG, B., & WILSON, J. (1985) Sense of Coherence: Examination of the construct. Poster presented at the Annual Meeting of the Southwestern Psychological Association, Austin, TX.

DONALD, I. (1995) Facet theory: defining research domains in G. M. Breakwell, S. Hammond & C. Fife-Schaw, Eds., Research Methods in Psychology, London: Sage.

DOWRENWEND, B.S. & DOWRENWEND B.P. (Eds.) (1974) Stressful Life Events: Their Nature and Effects. New York : John Wiley.

ERIKSON, E.H. (1950) Childhood and society. New York: Norton.

ERIKSON, E.H. (1968) Identity: youth and crisis. New York: Norton.

ERIKSON, E.H. (1969) The problem of ego-identity. In M. Gold & E. Douvan (Eds.), Adolescent development : Readings in Research and Theory. Boston : Allyn & Bacon.

EUROQUOL GROUP (1990) EuroQuol - a new facility for the measurement of health-related quality of life. Health Policy, 16, 199-208.

EYSENCK, H.J. (1953) The structure of human personality. London: Methuen.

EYSENCK, H.J. (1959) Manual of the Maudsley Personality Inventory. London:University

of London Press.

EYSENCK, H.J. (1963) (Ed.) Experiments with drugs. Oxford:Pergamon Press.

EYSENCK, H.J (1965) Fact and fiction in psychology. Ringwood, Austarlia: Penguin.

EYSENCK, H.J. (1981) A model for personality. Berlin : Springer.

EYSENCK, H.J. (1987) Theoretical Foundations of Behavioural Therapy, New York: Plenum.

EYSENCK, H.J. (1992) Four ways five factors are not basic. Personality and Individual Differences, 13, 667-673.

EYSENCK, H.J., & EYSENCK, S.B.G. (1964) Eysenck Personality Inventory. Seven Oaks : Hodder & Stoughton.

EYSENCK, H.J., EYSENCK, S.B.G., & BARRETT, P. (1995) Personality differences according to gender. Psychological Reports, 76, 711-716.

FAIRBROTHER, N. & MORETTI, M. (1998) Sociotropy, autonomy, and self-discrepancy : Status in depressed, remitted depressed and control participants. Cogntive Therapy, 22, 279-296.

FEINGOLD, A. (1994) Gender differences in personality: A meta-analysis. Psychological Bulletin, 116, 429-456.

FENNEL, M.J.V. (1997) Low self-esteem: a cognitive perspective. Behavioural and Cognitive Psychotherapy: An International Multidisciplinary Journal For The Helping Professions, 25, 1-25.

FERGUSON, E. & COX, T. (1993) Exploratory factor analysis: A user's guide. International Journal of Assessment and Selection.

FISCHMAN, J. (1987) Minding your health, getting tough. Psychology Today, December, 26-28.

FISHER, S. (1984) Stress and the Perception of Control. Lawrence Erlbaum: London.

FISKE, D.W. & MADDI, S.R. (1961) (Eds.) Functions of varied experience. Homewood: IL. Dorsey Press.

FORBES, A. & ROGER, D. (1999) Stress, social support and fear of disclosure. British Journal of Health Psychology, 4, 165-179.

FLANNERY, R.B. Jr. & FLANNERY, G.J. (1990) Sense of Coherence, life stress and distress: a prospective methodological inquiry. Journal of Clincial Psychology,46, 415-420.

FRANK, J.D. & FRANK, J.B. (1991) Persuasion and healing: A comparative study of psychotherapy. London: John Hopkins Press.

FRENZ, A.W., CAREY, M.P. & JORGENSEN, R.S. (1993) Psychometric evaluation of Antonovsky's Sense of Coherence Scale. Psychological Assessment,5, 145-153.

FRIEDMAN, H.S. (Ed.) (1991) Hostility, coping and health. Washington, DC: American Psychological Association.

FUNK, S.C. (1992) Hardiness: a review of theory and research. Health Psychology,11, 335-345.

FUNK, S.C., & HOUSTON, B.K. (1987) A critical analysis of the Hardiness Scale's validity and utility. Journal of Personality and Social Psychology,53, 572-578.

GANELLEN, R.J. & BLANEY, P.H. (1984) Hardiness and social support as moderators of the effects of life stress. Journal of Personality and Social Psychology, 47, 156-163.

GENTRY, W.D. & KOBASA, S.C. (1984) Social and psychological resources mediating stress-illness relationships in humans. W.D. Gentry (Ed.), Handbook of behavioural medicine (87-116). New York: Guilford Press.

GERGEN, K.J. & MORSE, S.J. Self-consistency: Measurement and validation. Proceedings of the 75th Annual Convention of the American Psychological Association, 1967, 2, 207-208.

GIBSON, L. M. & COOK, M. J. (1996) Neuroticism and sense of coherence. Psychological Reports,79, 343-49.

GIBSON, L.M. & COOK, M.J. (1997) Do health questionnaires which do not consider sex differences miss important information ? Psychological Reports, 81, 163-171.

GILLIGAN, C. (1982) In a different voice. Cambridge: Harvard University Press.

GJERDE, P.F. (1995) Alternative pathways to chronic depressive symptoms in young adults: gender differences in development trajectories. Child Development, 66, 1277-1300.

GLASER, R. (1984) Education and thinking. The role of knowledge. American Psychologist,39, No.2, 93 - 104.

GOEKOOP, J.G. (1998) The regulation of the hypothalamic-pituitary-axis in the pathogenisis of mood disorders. Acta Neuropsychiatrica, 10, 1-6.

GOLDBERG, D.P. (1972) The detection of psychiatric illness by questionnaire. London: Oxford University Press.

GOLDBERG, D.P., & WILLIAMS, P. (1988) A user's guide to the general health questionnaire. Windsor, UK: NFER-Nelson.

GRAHAME-SMITH, D.G. & ARONSON, J.K. (1992) Oxford Textbook of Clincial Pharmacology and Drug Therapy. Oxford University Press: Oxford.

GRASSIAN, S., & FRIEDMAN, N. (1986) Effects of sensory deprivation in psychiatric seclusion and solitary confinement. International Journal of Law and Psychiatry, 8, 49 - 65.

GRAY, J.A. (1970) The psychophysical basis of introversion - extraversion. Behavioural Research and Therapy,8, 249-266.

GRAY, J.A. (1981) A critique of Eysenck's theory of personality. In H.J. Eysenck (Ed.), A model for personality (246-276). Berlin: Springer.

GROSSARTH-MATICEK, R. (1989) Disposition, exposition, verhaltenmuster, organvorschadigung und stimulierung des zentralen nervensystems in der aetiologie des bronchial-, magen- und leberkarzi noms [Disposition, exposition,, behaviour, pre-damage of organs and stimulation of the central nervous system in the aetiology of lung, stomach, and liver cancer]. Deutsche Zeitschrift fur Onkologie, 21, 62-78.

GROSSARTH-MATICEK, R. & EYSENCK, H.J. (1990) Personality, stress and disease. Description and validation of new inventory. Psychological Reports, 66, 355-373.

GRUMAN, J. (1994) Antonovsky gives us no purchase on action.Advances,10, 19-21.

GUTTMAN, D. (1975) Parenthood: A key to the comparative study of the lifecycle. In N. Datan and L. H. Ginsberg (Eds.), Lifespan development psychology. Normative life crises. New York: Academic Press.

GUYLL, M. & CONTRADA, R. J. (1998) Trait hostility and ambulatory cardiovascular activity: Responses to social interaction. Health Psychology, 17, 30-39.

HACKMANN, A., SURAWY, C., & CLARK, D. (1998) Seeing yourself through others eyes: A study of spontaneously occurring images in social phobia. Behavioural and Cognitive Psychotherapy, 26, 3-12.

HAHN, M.E., (1966) California Life Goals Evaluation Schedule. Palo Alto: Western Psychological Services.

HALL, J.A. (1984) Nonverbal sex differences: Communication accuracy and expressive style. Baltimore: John Hopkins University Press.

HALLAM, R.S. (1985) Psychological perspectives on panic and agoraphobia. London: Academic Press.

HAMMEN, C., MAYOL, A., DE MAYO, R., & MARKS, T. (1986) Initial symptom levels and the life-events-depression relationship. Journal of Abnormal Psychology, 95, 114-122.

HARMAN, H.H. (1976) Modern Factor Analysis. Chicaga: University of Chicago Press.

HARRIS, T., SURTEES, P., & BANCROFT, J. (1991) Is sex necessarily a risk factor to depression ? British Journal of Psychiatry, 158, 708-712.

HART, K.E., HITTNER, J.B. & PARAS, K.C. (1991) Sense of coherence, trait anxiety and the perceived availability of social support. Journal of Research in Personality, 25, 137-145.

HARTUP, W.W. (1989) Social relationships and their developmental significance. American Psychologist, 44, 120-126.

HEINE, S.J. & LEHMAN, D.R. (1995) Cultural variation in unrealisitc optimism: Does the West feel more invulnerable than the East ? Journal of Personality and Social Psychology, 68, 595-607.

HEPPNER, P.P., & KRAUSKOPF, C.J. (1987) An information processin approach to personal problem-solving. The Counselling Psychologist, 15, 371-447.

HEPPNER, P.P., REEDER, L.B. & LARSON, L.M. (1983) Cognitive variables associated with personal problem-solving appraisal : Implications for counseling (1983) Journal of Counseling Psychology,30, 537-545.

HERDT, G. (1982) (Ed.) Rituals of Manhood: Male Initiation in Papua New Guinea. Berkeley, CA: University of California Press.

HERDT, G. (1984) (Ed.) Ritualised Homosexuality in Melanesia. Berkeley, CA: University of California Press.

HICKS, R., OKONEK, A. & DAVIS, J.M. (1980) The psycho-pharmacological approach, in I.L. Kutash , L.B. Schlesinger and Associates (Eds.) Handbook On Stress And Anxiety, San Franciso: Josey-Bass.

HODIAMONT, P. (1991) How normal are anxiety and fear ? International Journal of Social Psychiatry, 37, 43-50.

HOLAHAN, C.J., & MOOS, R.H. (1987) Personal and contextual determinants of coping strategies. Journal of Personality and Social Psychology, 52, 946-955.

HOLM, J.E., EHDE, D., LAMBERTY, K.J., DIX, A., & THOMPSON, J. (1988) The development of a salutogenic model model of stress and health: Psychometric properties of the sense of coherence construct. Poster presented at the 22nd Annual Meeting of the Association for the Advancement of Behaviour Therapy, New York.

HOLMES, T.H. & RAHE, R. H. (1967) The social readjustment rating scale. Journal of Psychosomatic Research,11, 213-218.

HOWELL, D.C. (1995) Fundamental statistics for the behavioural sciences, 3rd Ed. Belmont, CA: International Thomson Publishing.

HULL, J.G., VAN TREUREN, R.R. & VIRNELLI, S. (1987) Hardiness and health. A critique and alternative approach. Journal of Personaltiy and Social Psychology, 53, 518-530.

HUTT, J. & WEIDNER, G. (1993) The effects of task demand and decision latitude on cardiovascular reactivity to stress. Behavioral Medicine,18, 181-188.

ICD-10 Classification of mental and behavioural dissorders: Clinical descriptions and diagnotic guidlines. Geneva: World Health Organisation, 1992.

INGLEDEW, D.K., HARDY, L., COOPER, C.L., & JEMAL, H. (1996). Health behaviours reported as coping strategies: A factor analytical study. British Journal of Health Psychology,1, 263-281.

JACKSON, D.N. (1974) Personality research form manual. Goshen, NY: Research Psychologists Press.

JAMES, J.E. (1991) Healthcare, psychology and the scientist practitioner model. From speech "Health psychology and the community". presented at Annual Conference of Victorian Branch of the Australian Psychological Society, Monash University College, Gippsland, Churchill, Victoria. 28 - 30 June, 1991.

JERALD, K. (1997) Brief psychotherapies: Past, present, and future challenges. Journal of Psychotherapy Practice and Research, 6, 330-337.

JOHNSON, J.H., & SARASON, I.G. (1978) Life stress, depression and anxiety: internal - external control as a moderator variable. Journal of Psychosomatic Research, 22, 205 - 208.

KAPLAN, M. (1983) A Woman's View of DSM-III. American Psychologist, 38, 786-792.

KASLOW, F.W., HANSSON, K. & LUNDBLAD, A.M. (1994) Lonterm marriages in Sweden: and some comparisons with similar couples in the United States. Contemporary Family Therapy, 16, 521-537.

KEICOLT-GLASER, J.K., MALARKEY, W.B. CACIOPPO, J.T. & GLASER, R. (1994) Stressful persoanl relationships: immune and endocrine function. In R. Glaser & J. Kiecolt-Glaser (Eds) Handbook of human stress and immunity, London, Academic Press.

KELLER, S.E., SHIFLETT, S.C., SCHLEIFER, S.J. & BARTLETT, J.A. (1994) Stress, immunity and health, Ch 9,pp 217-244 in R. Glaser & J. Kiecolt-Glaser (Eds) Handbook of human stress and immunity, London, Academic Press.

KELLY, G.A. (1955) KELLY, G.A. (1955) The psychology of personal constructs, vol. 2., Clinical diagnosis and psychotherapy. New York: W.W. Norton.

KESSLER, R.C. (1979) Stress, social status and psychological distress. Journal of Health and Social Behaviour, 20, 259-272.

KESSLER, R.C., McGONAGLE, K.A., SWARTZ, M., BLAZER, D.G. & NELSON, C.B. (1993) Sex and depression in the National Comarbidity Survey I: Lifetime prevalence, chronicity and recurrence. Journal of Affective Disorders, 29, 85-96.

KIM, J. & MUELLER, C.W. (1978) Factor analysis, statistical methods and practical issues. London: Sage Publications.

KIMMEL, D.C. (1990) Adulthood and Aging. 3rd edition. New York: John Wiley and Sons.

KNAPP, R.R. (1962) Manual of Maudsley Personality Inventory. San Diego: Educational and Industrial Testing Service.

KOBASA, S.C. (1979) Stressful life events, personality and health: An inquiry into hardiness. Journal of Personality and Social Psychology, 37, 1-11.

KOBASA, S.C. (1985) Personal Views Survey. Department of Psychology, Graduate School and University Center, City University of New York.

KOBASA, S.C. & MADDI, S.R. (1982) personal communication ,1 November, reported in HULL, J.G., VAN TREUREN, R.R. & VIRNELLI, S. (1987) Hardiness and health. A critique and alternative approach. Journal of Personality and Social Psychology, 53, 518-530.

KOBASA, S.C., MADDI, S.R. & COURINGTON, S. (1981) Personality and constitution as mediators in the stress-illness relationship. Journal of Health and Social Behaviour,22, 368-378.

KOBASA, S.C., MADDI, S.R. & KAHN, S. (1982) Hardiness and health : A prospective study. Journal of Personality and Social Psychology,42, 168-177.

KOBASA, S.C., MADDI, S.R. & PUCCETTI, M.C. (1982) Personality and exercise as buffers in the stress-illness relationship. Journal of Behavioural Medicine, 4, 391-404.

KOBASA, S.C., MADDI, S.R., PUCCETTI, M.C. & ZOLA, M.A. (1985) Effectiveness of hardiness, exercise and social support as resources against illness. Journal of Psychosomatic Research, 29, 525-533.

KOBASA,S.C., MADDI, S.R. & ZOLA, M.A. (1983) Type A and hardiness. Journal of Behavioural Medicine,6, 41-50.

KOBASA, S.C. & PUCCETTI, M.C. (1983) Personality and social resources in stress resistance. Journal of Personality and Social Psychology, 45, 839 - 850.

KOHLBERG, L. (1966) A cognitive-developmental analysis of childrens' sex role concepts and attitudes. In E.E. Maccoby (Ed), The development of sex differences. Stanford, CA: Stanford University Press.

KOROTKOV, D.L. (1993) An assessment of the (shortform) sense of coherence personality measure : issues of validity and well-being. Personality and Individual Differences,14, 575-583.

LAWLER, K.A. & SCHMIED, L.A. (1992) A prospective study of women's health: The effects of stress, hardiness, locus of control, Type A behaviour and physiological reactivity. Women and Health, 19, 27-41.

LARA, M.E., LEADER, J., & KLEIN, D. N. (1997) The assosiation bewteen social support and course of depression: Is it confounded with personality ? Journal of Abnormal Psychology, 106, 478- 482.

LARSON, L.M. & HEPPNER, P.P. (1989) Problem solving appraisal in an alocoholic population. Journal of Counseling Psychology,36, 73-78.

LARSSON, G. & SETTERLIND, S. (1990) Worh load/work control and health: moderating effects of heredity, self image, coping and health behaviour. International Journal of Health and Science, 1, 79-88.

LEVENSON, H. (1974) Activism and powerful others: Distinctions within the concept of internal-external control. Journal of Personality Assessment, 38, 377-383.

LEVER, J. (1976) Sex differences and the games children play. Social problems,23, 478-487.

LIGHTSEY, O.R. Jnr. (1996) What leads to wellness ? The role of psychological resources in well-being. Counselling Psychologist, 24, 589-735.

LOBEL, T.E. & WINCH, G.L. (1987) Neuroticism, anxiety and social development. British Journal of Clinical Psychology, 26, 63-64.

LU, L. & WU, H. (1998) Gender-role traits and depression: self esteem and control as mediators. Counselling Psychology Quarterly, 11, 95-107.

LUEPKER, R.V. & RASTAM, L. (1990) Involving community health professionals and systems in N. Bracht Health Promotions at Community Level. Sage Publications: London.

MACLEOD, A.K., & BYRNE, A. (1996) Anxiety, depression, and the anticipation of future positive and negative experiences. Journal of Abnormal Psychology, 105, 286-289.

MADDI, S.R. (1987) Hardiness training at Bell Telephone. In J. Opatz (Ed.) Health Promotion evaluation pp 121 - 158. Stephens Point, WI: Natural Wellness.

MADDI, S.R., BARTONE, P.T. & PUCCETTI, M.C. (1987) Stressful events are indeed a factor in physical illness. Reply to Schroeder & Costa (1984) Journal of Personality and Social Psychology,32, 833-843.

MADDI, S.R., HOOVER, M., & KOBASA, S.C. (1982) Alienation and exploratory behaviour. Journal of Persoanlity and Social Psychology, 42, 884 -890.

MADDI, S.R. & KHOSHABA, D.M. (1994) Hardiness and mental health. Journal of Personality Assessment, 63, 265-274.

MADDI, S.R. & KOBASA, S.C. (1984) The hardy executive: Health under stress. Homewood, Ilinois: Dow Jones-Irwin.

MADDI, S.R., KOBASA, S.C. & HOOVER, M. (1979) An alienation test. Journal of Humanistic Psychology, 19, 73-76.

MANNING, M.R., WILLIAMS, R.F. & WOLFE, D.M. (1988) Hardiness and the relationship between stressors and outcomes. Work and Stress, 2, 205-216.

MARGALIT, M. (1985) Perception of parents' behaviour, familial satisfaction, and sense of coherence in hyperactive children. Journal of School Psychology, 23, 355 - 364.

MARAGALIT, M. & EYSENCK, S.B.G. (1990) Prediction of coherence in adolescence: Gender differences in social skills, personality and family climate. Journal of Research in Personality,24, 510- 521.

MARANON, G. (1924) Contribution a l'etude de l'action emotive de l,adrenaline Revue Francaise d'Endocrinologie, 2, 301-325.

MARTIN, M. (1985) Neuroticism as predisposition towards depression: A cognitive mechanism. Personality and Individual Differences,6, 353-365.

MARTORANO, J.T. & KILDAHL, J.P. (1989) Beyond Negative Thinking. Breaking The Cycle of Depressing and Anxious Thoughts. Plenum Press: New York.

McCOLL, A.J. & GULLIFORD, M.C. (1993) Population Health Outcome Indicators for the National Health Service. Faculty of Public Health Medicine of the Royal College of Physicians, London.

McCRANIE, E., LAMBERT, V. & LAMBERT, C. (1987) Work stress, hardiness and burnout among hospital staff nurses. Nursing Research,36, 374-378.

McKEOWN, T. (1979) The role of medicine: dream mirage or nemisis ? Nuffield Provincial Hospitals Trust. Oxford University Press.

McLANAHAN, S.S. & GLASS, J.L. (1985) A note on the trend in sex differences in psychological distress. Journal of Health and Social Behaviour, 26, 328-335.

McSHERRY, W.C. & HOLM, J.E. (1994) Sense of coherence: Its effects on psycholgical and physiological processes proir to, during and after a stressful

situation. Journal of Clinical Psychology, 50, 476-487.

MEAD, M. (1934) Mind, self and society. Chicago: University of Chicago Press.

MEIJMAN, T.F. & KOMPIER, M.A.J. (1998) Bussy business: How urben bus drivers cope with time pressure, passengers and traffic safety. Journal of Occupational Health Psychology, 3, 109-121.

MILLER, T.Q., SMITH, T.W., TURNER, C.W., GUIJARRO, M.L. & HALLET, A.J. (1996) A meta-analytic review of research on hostility and physical health. Psycholgical Bulletin, 119, 322-348.

MONEY, J. (1988) Gay, Straight and In-Between. Oxford University Press: New York.

MOOS, R.H. (1990) Coping Responses Inventory Manual. Center for Health Care Evaluation, Stanford University and Veteran's Administration Medical Centers, Palo Alto, California.

MORRILL, W.H., OETTING, E.R., & HURST, J.C. (1974) Dimensions of counselor functioning. Personnel and guidance Journal, 52, 354 - 359.

MOSS, G.E. (1973) Illness, immunity, and social interaction. New York: Wiley, 1973.

MURPHY, E. (1989) Depression in the elderly. in K.R. Herbst and E.S.Pakel, Depression an intergrative approach, Oxford: Heineman Medical Books.

MURRAY, J. (1995) Prevention of Anxiety and Depression in Vulnerable Groups. London: Gaskell.

NAIRNE, K. & SMITH, G. (1984) Dealing With Depression, London: Womens' Press.

NEWELL, R. (1993) Questionnaires in N. Gilbert (Ed.) Researching Social Life. London : Sage

NEZU, A.M. (1985) Differences in psychological distress between effective problem solvers and ineffective problem solvers. Journal of Counseling Psychology, 32, 135-138.

NEZU, A.M., & NEZU, C.M. (1987) Psychological distress, problem solving, and coping reactions: Sex role differences. Sex Roles, 16, 205-214.

NOLEN-HOEKSEMA, S. (1987) Sex differences in unipolar depression. Psychological Bulletin, 116, 429-456.

NOLEN-HOEKSEMA, S. (1990) Sex Differences in Depression, Stanford University Press: Stanford, CA.

NOTMAN M.T. (1991) Gender development. In M.T. NOTMAN, & C.C. NADELSON Eds. Women and Men. New Perspectives on Gender Differences. American Psychiatric Press, Inc. Washington: DC.

NOTMAN M.T., & NADELSON C.C. (1991) Gender differences in brain and behaviour. In M.T. NOTMAN, & C.C. NADELSON Eds. Women and Men. New Perspectives on Gender Differences. American Psychiatric Press, Inc. Washington: DC.

OAKLEY, A (1993) The limits of the professional imagination. in A. Beattie, M. Gott, L.Jones & M. Sidell (Eds.) Health and Wellbeing a Reader. London : Macmillan Press.

OKUN, M.A., ZAUTRA, A.J. & ROBINSON, S.E. (1988) Hardiness and health among women with rheumatoid arthritis. Personality and Individual Differences, 9, 101-107.

ORMEL, J., & WOHLFARTH, T. (1991) How neurotics longterm difficulties and life situation change influence psychological distress: a longitudinal model. Journal of Personality and Social Science,60, 744-755.

OVERHOLSER, J.C. (1993) Elements of the socratic method: systematic questioning. Psychotherapy,30, 112-124.

PADESKY, C.A. (1994) Schema change processes in cognitive therapy. Clinical Psychology and Psychotherapy, 1, 267-278.

PADESKY, C.A. (1998) When there's not enough time: Inovations in cognitive therapy. October 2-3, Great Hall, Imperial College of Science, Technology and Medicine, London.

PADESKY, C.A. & MOONEY, K.A. (1998) Between two minds: The transformational power of underlying assumptions. Workshop presented at the 28th Congress of the European Association for Behaviouraland Cognitive Therapies, September, Cork, Eire.

PAKEL, E.S. (1989) The backgound: extent and nature of the disorder in K.R. Herbst and E.S.Pakel, Depression an intergrative approach, Oxford: Heineman Medical Books.

PEARLIN, L.I., MENAGHAN, E.G., LIEBERMAN,M.A., & MULAN,J.T. (1981) The stress process. Journal of Health and Social Behaviour, 22, 337-356.

PEARSON, A. (1987) Outcome measures in A. Pearson (Ed) Nursing Quality Measurement John Wiley and Sons: Chichester.

PETERSON, C., MAIER, S.F., & SELIGMAN, M.E.P. (1993) Learned helplessness: a theory for the age of personal control, Oxford, UK: Oxford University Press.

PETRIE, K. & AZARIAH, R. (1990) Health promoting variables as predictors of response to a brief pain management program. Clinical Journal Of Pain,6, 43-46.

PETRIE, K., & BROOK, R. (1992) Sense of coherence, self esteem, depression and hopelessness as correlates of reattempting suicide. British Journal of Psychology,31, 293-300.

PIAGET, J. (1965) The moral judgement of the child. New York: Free Press.

PINNEL, J.P.J. (1993) Biopsychology, (2nd ed.)London, UK: Allyn and Bacon.

POLLOCK, S.E., & DUFFY, M.E. (1990) The Health-Related Hardiness Scale: Development and psychometric analysis. Nursing Research, 39, 218 -222.

POTTIE (1990) Unpublished research cited in ANTONOVSKY, A. (1993) The structure and properties of the sense of coherence scale. Social Science and Medicine,36, 725-733.

PRIEL, B., GONIK, N., & RABINOWITZ, B. (1993) Appraisals of childbirth experience and newborn characteristics: The role of hardiness and affect. Journal of Personality, 61, 299-315.

RHODEWALT, F. & AGUSSDOTTIR, S. (1984) On the relationship of hardiness to the Type A behaviour pattern: Perception of life events versus coping with life events. Journal of Research in Personality,18, 212-223.

RHODEWALT, F. & ZONE, J.B. (1989) Appraisal of life changes, depression and illness in hardy and nonhardy women. Journal of Personaltiy and Social Psychology,56, 81-88.

RIM, Y. (1987) A comparitive study of 2 taxonomies of coping styles, personality and sex. Personality and Individual Differences, 4, 521 - 526.

ROBSON, C. (1993) Real World Research. Oxford : Blackwell.

RODIN, J. & LANGER, E.J. (1977) Longterm effects of a control-relevant intervention with the institutionalized aged. Journal of Personality and Social Psychology,35, 897 - 902.

ROGER, D. (1988) The role of emotion control in human stress responses. Paper presented at the Annual Conference of the British Psycholgical Society, April, Leeds.

ROGER, R. & NAJARIAN, B. (1998) The relationship between emotioanl rumination and cortisol secretion under stress. Personality and Individual Differences, 24, 531-538.

ROGER, D. & NASH, P. (1995) Coping. Nursing Times, 91, 42-43.

ROSENMAN, R.H., SWAN, G.E. & CARMELLI, D. (1988) Definition, assessment, and evolution of the Type A behaviour pattern. In B.K. Houston and C.R. Snyder (Eds.) Type A behaviour pattern: Research, theory, and intervention. New York: Wiley.

ROSENTHAL, H. (1993) Neighbourhood health projects - some new approaches to health and community work in parts of the United Kingdom in A. Beattie, M. Gott, L.Jones & M. Sidell (Eds.) Health and Wellbeing a Reader. London : Macmillan Press.

ROTTER, J.B. (1966) Generalised expectancies for internal versus external control of reinforcement. Psychology Monographs, 1, 80.

ROTH, M. (1984) Agoraphobia, panic disorder, and generalised anxiety disorder, some implications of recent advances. Psychiatric Develop.,2, 31-52.

ROTTER, J.B. (1966) Generalised expectancies for internal versus external control of reinforcement. Psychological Monographs, 80, Whole no. 609, 1-28.

ROTTER, J.B., SEEMAN, M., & LIVERANT, S. (1962) Internal vs external locus of control reinforcement: a major variable in behaviour theory. In N.F. Washburne (Ed.) Decisions, values, & groups. 473-516. London: Pergamon.

RUBLE, D.N., GREULICH, F., POMERANTZ, E. M., & GOCHBERG, B. (1993) The role of gender processes in development of sex differences in self-evaluation and depression. Journal of Affective Disorders, 29, 97-128.

RUSSO, F.R. (1991) Reconstructing the psychology of women: An overview. In M.T. NOTMAN & C.C. NADELSON Eds. Women and Men. New Perspectiveson Gender Differences. American Psychiatric Press, Inc. Washington: DC.

RUST, J. & GOLOMBOK, S. (1989) Modern Psychometrics: The science of psychological assessment. London : Routledge.

RYLAND, E. & GREENFELD, S. (1991) Work stress and wellbeing : An investigation of Antonovsky's sense of coherence model. Handbook on jobstress [special issue] Journal of Social Behavior and Personality,6, 39-54.

SALTER, A.C. (1995) Transforming trauma: A guide to undrstanding and treating adult survivors of child sexual abuse. Thousand Oaks, CA: Sage Publications Inc.

SANAVIO, S. (1988) Obsessions and compulsions: The Padua Inventory. Behaviour Research and Therapy, 26, 169-177.

SARTRE, J.P., (1947) The Age of Reason ; translated by Eric Sutton. New York: A.A. Knopf.

SCHACHTER, S., & SINGER, J.E. (1962) Cognitive, social and physiological determinants of emotional states. Psychological Review,69,379-399.

SCHEIER, M.F., CARVER, C.S. & BRIDGES, M.W. (1994) Distinguishing optimism from neuroticism (and trait anxiety, self mastery and self esteem): A reevaluation of the Life Orientation Test. Journal of Personality and Social Psychology, 67, 1063-1078.

SCHULZ, R. & HECKHAUSEN, J. (1996) A life span model of successful aging. American Psychologist, 51, 702-714.

SCOTTISH OFFICE PUBLICATION (1998) Designed to care - Renewing the National Health Service in Scotland. (White Paper).

SEYLE, H. (1956) The stress of life. London: Longmans Green and Co.

SEYLE, H. (1974) Stress without distress. New York: Signet.

STREINER, D.L. & NORMAN, G.R. (1989) Health measurement cales: A practical guide to their development and use. New York: Oxford University Press.

STRICKLAND, B.R. (1978) Internal-external expectancies and health-related behaviours. Journal of Consulting and Clinical Psychology, 46, 1192-1211.

SMITH, T.W., POPE, M.K., RHODEWALT, F. & POULTON, J.L. (1989) Optimism, neuroticism, coping and symptom reports: An alternative interpretation of the Life Orientation Test. Journal of Personality and Social Psychology, 56, 640-648.

SOLOMON, G.F., TEMOSHOK, L., O'LEARY, N.A. & ZICH, J. (1987) An intensive psychoimmunologic study of long-surviving persons with AIDS. Annals. of the New York Academy of Sciences, 496, 647 - 655.

STONE, A.A., & NEALE, J.M. (1984) New measure of daily coping: Development and preliminary results. Journal of Personality and Social Psychology, 46, 892-906.

STRONGMAN, K.T. (1987) The psychology of emotion, (3rd ed.) Chichester, UK: Wiley.

TAYLOR, S. (1986) Health Psychology. New York: Random House.

TEASDALE, J.D. & DENT, J. (1987) Cognitive vulnerability to depression: An investigation of two hypotheses. British Journal of Clinical Psychology,26, 113-126.

TELLEGEN, A. (1985) Structures of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In A.H. Tuma & J.D. Maser (Eds.), Anxiety and the anxiety dissorders. New York: Academic Press.pp33-103.

THOMSON, W.C. & WENDT, J.C. (1995) Contribution of hardiness and school climate to alienation experienced by student teachers.Journal of Educational Research,88, 269-274.

THURSTONE, L. L. (1947) Multiple Factor Analysis. Chicago: University of Chicago Press.

UCHINO, B.N., CACIOPPO, J.T. AND KEICOLT-GLASER, J. (1996) The relationship between social support and physiologialc processes: A review with emphasis on underlying mechanisms and implications for health. Psychological Bulletin, 119, 488-531.

VAN DER VELDEN, P.G. & KLEBER, R.J. (1996) With an eye to tomorrow: a review of EMDR studies. Tijdschrift voor Psychiatrie, 38, 30-39.

VERBRUGGE, L.M. (1989) The twain meet : Empirical explanations of sex differences in health and mortality. Journal of Health and Social Behaviour, 30, 282-304.

VOLLRATH, M., TORGERSEN, S., & ALNAES, R. (1995) Personality as long-term predictor of coping. Persoanlity and Inidividual Differences, 18, 117-125.

WAELDE, L. C., SILVERN, L., HODGES, W.F. (1994) Stressful life events : Moderators of the relationships of gender and gender roles to self reported depression and suicidality among college students. Sex Roles,30, 1-22.

WARREN, L.W. & McEACHREN, L. (1983) Psychological correlates of depressive symptomatology in adult women. Journal of Abnormal Psychology, 92, 151-160.

WATT, A. & RODMELL, S. (1933) Community involvement in health promotion: Progress or panacea ? in A. Beattie, M. Gott, L. Jones & M. Sidel (Eds.) Health and wellbeing. Basingstoke: Macmillan Press.

WEDDERBURN, Z. (1994) Shiftwork, health and personality hardiness: an apparent double link. Personal communication.

WILLIAMS, S.J. (1990) The relationship among stress, hardiness, sense of coherence and illness in critical care nurses. Medical Psychotherapy, 3, 171-86.

WILLIAMS, J.E. & BEST, D.L. (1990) Measuring sex stereotypes. A multination study. Newbury Park, CA: Sage.

WILSON, R., CHRISTENSEN, P., MERRIFIELD, P., & GUILFORD, J. (1975) Alternate Uses Test. Beverly Hills, CA: Sheridan Psychological Company.

WINDLE, R.J., WOOD, S.A., SHANKS, N., LIGHTMAN, S.L. & INGRAM, C.D. (1998) Ultradian rhythm of basal corticosterone release in female rat: dynamic inetraction with the response to acute stress. Endocrinology, 139, 443-450.

WOOD, C. (1987), Buffer of hardiness: an interview with Suzanne C.Ouellette Kobasa. Advances, 4, 37- 45. (Institute for the Advancement of Health,Hogrefe International, Inc.)

WOODS, R.T. & BRITTON, P.G. (1977) Psychological approaches to treatment of the elderly.Age and Aging, 6, 104-112.

WORLD HEALTH ORGANISATION - Europe Healthy Cities : Action Strategies For Health Promotion (1987) Copenhagen: W.H.O.

YONTEF, G.M. & SIMKIN, J.S. (1989) Gestalt therapy (Ch9) in R.J. Corsini and D. Wedding (Eds.) Current Psychotherapies, 4th Ed, Itasca: IL, Peacock Publishers.

YUSUPOFF, L., HADDOCK, G., SELLWOOD, W., & TARRIER, N. (1996) Cognitive-behavioural therapy for hallucinations and delusions: current practices and and future trends. in Trends in Cognitive and Behavioural Therapies. P.M. Salkovskis, John Wiley & Sons Ltd.

ZENMORE, R. & RINHOLM, J. (1989) Vulnerability to depression as a function of parental rejection. Canadian Journal of Behavioural Science, 21, 364-376.

ZIGLIO, E. (1991) Indicators of health promotion policy: directions for research (Ch 3), in B. Bandura and I. Kickbusch (Eds), Health Promotion Research, Towards a New Social Epidemiology, World Health Organisation.

ZUCKERMAN, M. (1991) Psychobiology of personality. Cambridge, UK: Cambridge University Press.

APPENDICES
CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

APPENDIX I: COVERSHEET FOR BATTERY OF QUESTIONNAIRES

Age _____

Sex M__ F__

Please complete the following questionnaires and return them to the researcher at the front of the room. Please do not confer as we are interested in the answers of each individual. All answers are confidential and these questionnaires will be destroyed after the anonymous data is collated.

Participation in this study is voluntary.

Thank you for your help.

Please exclude
Sections 2-5
from digitisation.

APPENDIX II: SENSE OF COHERENCE QUESTIONNAIRE INCLUDING SCORING AND PRESENTATION INSTRUCTIONS

SENSE OF COHERENCE SCORING AND PRESENTATION INSTRUCTIONS

The questionnaire should be given to the subjects with instructions to read the paragraph at the beginning and ask anything about which they are unclear before they begin.

A total score is calculated by adding up the numbers which are circled. The scores on the following questions must be reversed; 1,4,5,6,7,13,14,16,20,23,25,27, for example someone circling 2 on a question would be given a score of 6. A high score denotes a strong sense of coherence.

Sub scores may be determined for the dimensions as follows:

Comprehensibility; 1,3,5,10,12,15,17,19,21,24,26.

Manageability; 2,6,9,13,18,20,23,25,27,29.

Meaningfulness; 4,7,8,11,14,16,22,28,

SENSE OF COHERENCE QUESTIONNAIRE

This is a series of questions relating to various aspects of our lives. Each question has seven possible answers. Please mark the number which expresses your answer, with number1 and 7 being the extreme answers. If the words under 1 are right for you, circle 1; if the words under 7 are right for you, circle 7. If you feel differently, circle the number which best expresses your feelings.
Please give only one answer to each question.

(1) When you talk to people do you have the feeling that they do not understand you ?

1 2 3 4 5 6 7
never have this feeling — always have this feeling

(2) In the past when you had to do something which depended on co-operation with others, did you have the feeling that it:

1 2 3 4 5 6 7
surely wouldn't get done — surely would get done

(3) Think of the people with whom you come into contact daily, aside from the ones to whom you feel closest. How ell do you know most of them ?

1 2 3 4 5 6 7
you feel that they're strangers — you know them very well

(4) Do you have the feeling that you don't really care about what goes on around you ?

1 2 3 4 5 6 7
very seldom or never — very often

(5) Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well ?

1 2 3 4 5 6 7
never happened — always happened

(6) Has it happened that people whom you counted on disappointed you ?

1 2 3 4 5 6 7
never happened — always happened

(7) Life is:

1 2 3 4 5 6 7
full of interest — completely routine

(8) Until now your life has had:

1 2 3 4 5 6 7
no clear goals or purpose at all — very clear goals and purpose

(9) Do you have the feeling that you're being treated unfairly ?

1	2	3	4	5	6	7
very often						very seldom or never

(10) In the past ten years your life has been:

1	2	3	4	5	6	7
full of changes without your knowing what will happen next						completely consistent and clear

(11) Most of the things in the future will be:

1	2	3	4	5	6	7
completely facinating						deadly boring

(12) Do you have the feeling that you are in an unfamiliar situation and don't know what to do ?

1	2	3	4	5	6	7
very often						very seldom or never

(13) What best describes how you see life:

1	2	3	4	5	6	7
one can always find a solution to painful things in life						there is no solution to painful things in life

(14)When you think about life,you very often:

1	2	3	4	5	6	7
feel how good it is to be alive						ask yourself why you exist at all

(15) When you face a difficult problem, the choice of a solution is :

1	2	3	4	5	6	7
always confusing and hard to find						always completely clear

(16) Doing the things you do every day is :

1	2	3	4	5	6	7
a source of deep pleasure and						a source of pain and boredom

17) Your life in the future will probably be :

1	2	3	4	5	6	7
ull of changes vithout your nowing what vill happen next atisfaction					completely consistent and clear	

18) When something unpleasant happened in the past your tendency was:

1	2	3	4	5	6	7
to eat yourself ıp" about it					to say "ok that's it, I have to live with it," and go on	

19) Do you have very mixed up feelings and ideas ?

1	2	3	4	5	6	7
very often					very seldom or never	

20) When you do something that gives you a good feeling:

1	2	3	4	5	6	7
's certain that ou'll go on eeling good					it's certain that something will happen to spoil the feeling	

21) Does it happen that you have feelings inside you would rather not feel ?

1	2	3	4	5	6	7
very often					very seldom or never	

) You anticipate that your personal life in the future will be :

1	2	3	4	5	6	7
otally without neaning or purpose					full of meaning and purpose	

23) Do you think that there will always be people whom you'll be able to count on n the future ?

1	2	3	4	5	6	7
ou're certain here will be					you doubt there will be	

24) Does it happen that you have the feeling that you dcn't know exactly what's bout to happen ?

1	2	3	4	5	6	7
very often					very seldom or never	

25) Many people - even those with a strong character - sometimes feel like losers in certain situations. How often have you felt this way in the past ?

1	2	3	4	5	6	7
never						very often

26) When something happened have you generally found that:

1	2	3	4	5	6	7
you over-estimated or under estimated its importance						you saw things in the right proportion

(27) When you think of difficulties you are likely to face important aspects of life, do you have the feeling that :

1	2	3	4	5	6	7
you will always succeed in over-coming the difficulties						you won't succeed in over-coming the difficulties

(28) How often do you have the feeling that there's little meaning in the things you do in your daily life ?

1	2	3	4	5	6	7
very often						very seldom or never

(29) How ofetn do you have feelings that you're not sure you can keep under control?

1	2	3	4	5	6	7
very often						very seldom or never

THANK YOU

APPENDIX III: GENERAL HEALTH QUESTIONNAIRE ,12 QUESTION VERSION INCLUDING SCORING AND PRESENTATION INSTRUCTIONS

GENERAL HEALTH QUESTIONNAIRE ,12 QUESTION VERSION
PRESENTATION AND SCORING INSTRUCTIONS

The questionnaire should be given to the subjects with instructions to read the paragraph at the beginning and ask anything about which they are unclear before they begin.

A total score is calculated using the 0-0-1-1 scoring method where the two columns on the left receive a score of 0 and the two columns on the right receive a score of 1.

A high score indicates increased likelihood of mental pathology.

Although there is a space for names on this form all subjects are instructed to ignore this.

The General Health Questionnaire

NFER NELSON

GHQ-12

Please read this carefully.

We should like to know if you have had any medical complaints and how your health has been in general, *over the last few weeks*. Please answer ALL the questions simply by underlining the answer which you think most nearly applies to you. Remember that we want to know about present and recent complaints, not those that you had in the past.

It is important that you try to answer ALL the questions.

Thank you very much for your co-operation.

Client's name ..... Date .....

IAVE YOU RECENTLY:

1 –	been able to concentrate on whatever you're doing?	Better than usual	Same as usual	Less than usual	Much less than usual
2 –	lost much sleep over worry?	Not at all	No more than usual	Rather more than usual	Much more than usual
3 –	felt that you are playing a useful part in things?	More so than usual	Same as usual	Less useful than usual	Much less useful
4 –	felt capable of making decisions about things?	More so than usual	Same as usual	Less so than usual	Much less capable
5 –	felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
6 –	felt you couldn't overcome your difficulties?	Not at all	No more than usual	Rather more than usual	Much more than usual
7 –	been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual
8 –	been able to face up to your problems?	More so than usual	Same as usual	Less able than usual	Much less able
9 –	been feeling unhappy and depressed?	Not at all	No more than usual	Rather more than usual	Much more than usual
10 –	been losing confidence in yourself?	Not at all	No more than usual	Rather more than usual	Much more than usual
11 –	been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual
12 –	been feeling reasonably happy, all things considered?	More so than usual	About same as usual	Less so than usual	Much less than usual

Published by The NFER-NELSON Publishing Company Ltd,
Darville House, 2 Oxford Road East, Windsor, Berkshire SL4 1DF, UK.

Code 4900 02 4

APPENDIX IV: HARDINESS QUESTIONNAIRE INCLUDING PRESENTATION AND SCORING INSTRUCTIONS

DISPOSITIONAL RESILIENCE SCALE (HARDINESS QUESTIONNAIRE)
PRESENTATION AND SCORING INSTRUCTIONS

The questionnaire should be given to the subjects with instructions to read the paragraph at the beginning and ask anything about which they are unclear before they begin.

A total score is calculated by adding up all circled numbers which have a + included in the brackets at the end of the question. All other questions should have the sores reversed. For example a question without a + which is circled as 0 would be given a score of 3.

Sub scores may be determined from the dimensions as follows;

Commitment; 1,7,8,9,17,18,23,24,25,31,37,39,41,44,45.

Control; 2,3,4,10,11,13,14,19,22,26,28,29,34,42,43.

Challenge; 5,6,12,15,16,20,21,27,30,32,33,35,36,38,40.

HARDINESS QUESTIONNAIRE

INSTRUCTIONS

Below are statements about life that people often feel differently about. Circle a number to show how you feel about each one. Read the items carefully and indicate how much you think each one is true in general. There are no right or wrong answers; just give your own honest opinions.

Not at all true = 0 A little true = 1 Quite true = 2 Completely true =3

. Most of my life gets spent doing things that are worthwhile (*CM+). 0 1 2 3
. Planning ahead can help avoid most future problems (*CO+)..... 0 1 2 3
. Trying hard doesn't pay, since things still don't turn out right (CO). 0 1 2 3
. No matter how hard I try, my efforts usually accomplish nothing (*CO)..... 0 1 2 3
. I don't like to make changes in my everyday schedule (*CH)..... 0 1 2 3
. The "tried and true" ways are always best (*CH)..... 0 1 2 3

7. Working hard doesn't matter, since only the bosses profit by it (*CM) ... 0 1 2 3
8. By working hard you can always achieve your goals (*CM+)..... 0 1 2 3
9. Most working people are simply manipulated by their bosses (CM) 0 1 2 3
0. Most of what happens in life is just meant to be (*CO)..... 0 1 2 3
. It's usually impossible for me to change things at work (CO)..... 0 1 2 3
2. New laws should never hurt a person's pay-check (CH)..... 0 1 2 3

. When I make plans, I'm certain I can make them work (*CO+)..... 0 1 2 3
. It's very hard for me to change a friend's mind about something (CO). 0 1 2 3
's exciting to learn something about myself (*CH+)..... 0 1 2 3
People who never change their minds usually have good judgment (CH)..... 0 1 2 3
I really look forward to my work (*CM+)..... 0 1 2 3
Politicians run our lives (CM)..... 0 1 2 3

If I'm working on a difficult task, I know when to seek help (*CO+).... 0 1 2 3
I won't answer a question until I'm really sure I understand it (*CH).... 0 1 2 3
I like a lot of variety in my work (*CH+)..... 0 1 2 3
Most of the time, people listen carefully to what I say (*CO+)..... 0 1 2 3
Daydreams are more exciting than reality for me (CM)..... 0 1 2 3
Thinking of yourself as a free person just leads to frustration (*CM)..... 0 1 2 3

25. Trying your best at work really pays off in the end (*CM+)..... 0 1 2 3
26. My mistakes are usually very difficult to correct (*CO)..... 0 1 2 3
27. It bothers me when my daily routine gets interrupted (*CH)..... 0 1 2 3
28. It's best to handle most problems by just not thinking of them (CO)..... 0 1 2 3
29. Most good athletes and leaders are born, not made (*CO)..... 0 1 2 3
30. I often wake up eager to take up my life wherever it left off (*CH+)..... 0 1 2 3

31. Lots of times, I don't really know my own mind (*CM)..... 0 1 2 3
32. I respect rules because they guide me (*CH)..... 0 1 2 3
33. I like it when things are uncertain or unpredictable (*CH+)..... 0 1 2 3
34. I can't do much to prevent it if someone wants to harm me (*CO)... 0 1 2 3
35. People who do their best should get full support from society (CH)..... 0 1 2 3
36. Changes in routine are interesting to me (*CH+)..... 0 1 2 3

37. People who believe in individuality are only kidding themselves (CM) ... 0 1 2 3
38. I have no use for theories that are not closely tied to facts (*CH) 0 1 2 3
39. Most days, life is really interesting and exciting for me (*CM+)..... 0 1 2 3
40. I want to be sure someone will take care of me when I'm old (CH) 0 1 2 3
41. It's hard to imagine anyone getting excited about working (*CM)..... 0 1 2 3
42. What happens to me tomorrow depends on what I do today (*CO+)... 0 1 2 3

43. If someone gets angry at me, it's usually no fault of mine (CO) 0 1 2 3
44. It's hard to believe people who say their work helps society (CM) 0 1 2 3
45. Ordinary work is just too boring to be worth doing (*CM)..... 0 1 2 3

APPENDIX V: EYSENK PERSONALITY INVENTORY INCLUDING INSTRUCTIONS ABOUT PRESENTATION AND SCORING

EYSENK PERSONALITY QUESTIONNAIRE PRESENTATION AND SCORING INSTRUCTIONS

The questionnaire should be given to the subjects with instructions to read the paragraph at the beginning and ask anything about which they are unclear before they begin.

Scoring is completed using the template provided yielding three scores of Extroversion, Neuroticism and a Lie Scale. A high score represents the strength of the personality characteristic.

E.P.I.

FORM A

NAME..... AGE.....

OCCUPATION..... SEX.....

N= ☐ E= ☐ L= ☐

Instructions

Here are some questions regarding the way you behave, feel and act. After each question is a space for answering "YES" or "NO".

Try to decide whether "YES" or "NO" represents your usual way of acting or feeling. Then put a cross in the circle under the column headed "YES" or "NO". Work quickly, and don't spend too much time over any question; we want your first reaction, not a long-drawn out thought process. The whole questionnaire shouldn't take more than a few minutes. Be sure not to omit any questions.

Now turn the page over and go ahead. Work quickly, and remember to answer every question. There are no right or wrong answers, and this isn't a test of intelligence or ability, but simply a measure of the way you behave.

Hodder & Stoughton

A MEMBER OF THE HODDER HEADLINE GROUP

N L

FORM A

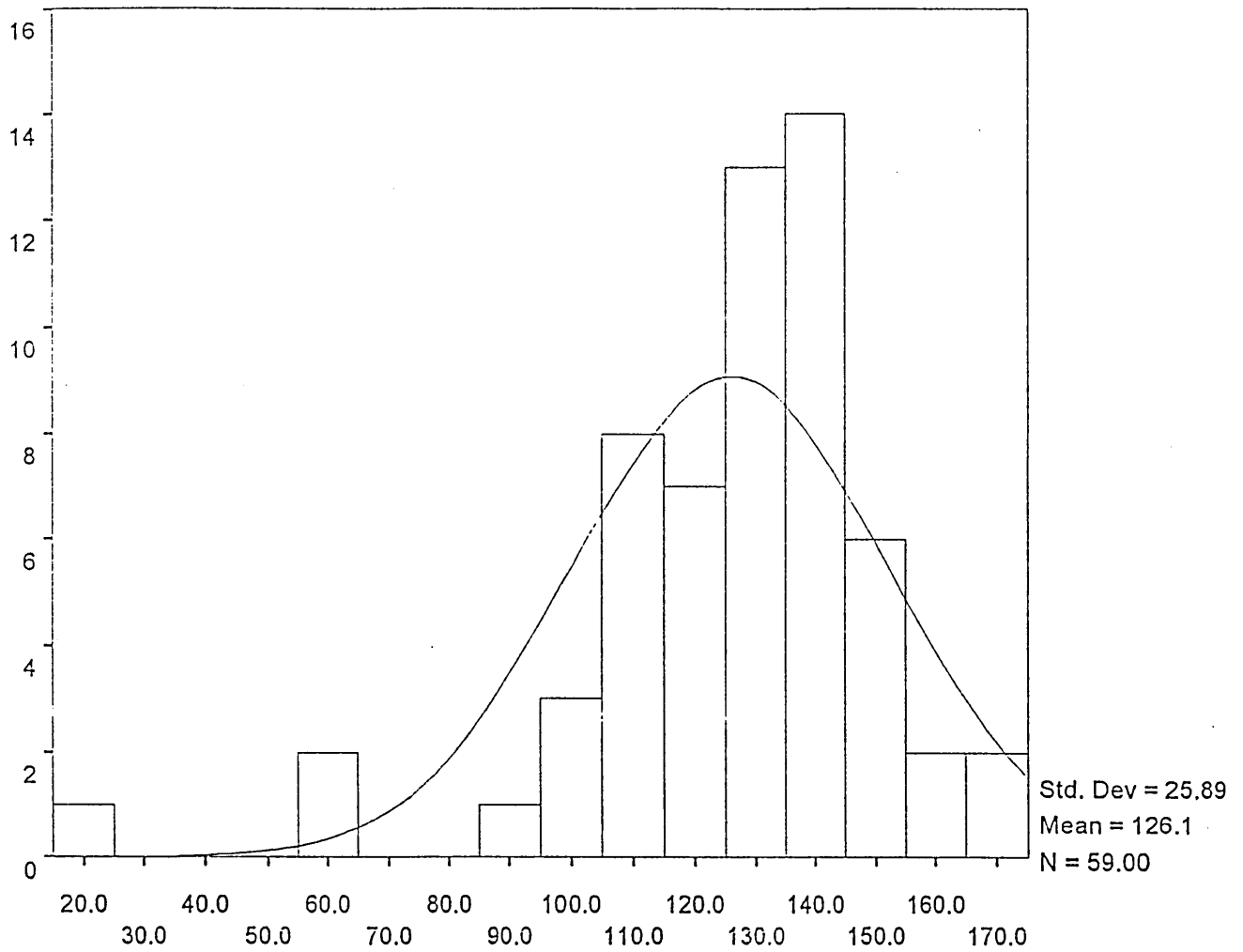
	YES	NO
Do you often long for excitement?	○	○
Do you often need understanding friends to cheer you up?	○	○
Are you usually carefree?	○	○
Do you find it very hard to take no for an answer?	○	○
Do you stop and think things over before doing anything?	○	○
If you say you will do something do you always keep your promise, no matter how inconvenient it might be to do so?	○	○
Does your mood often go up and down?	○	○
Do you generally do and say things quickly without stopping to think?	○	○
Do you ever feel "just miserable" for no good reason?	○	○
Would you do almost anything for a dare?	○	○
Do you suddenly feel shy when you want to talk to an attractive stranger?	○	○
Once in a while do you lose your temper and get angry?	○	○
Do you often do things on the spur of the moment?	○	○
Do you often worry about things you should not have done or said?	○	○
Generally, do you prefer reading to meeting people?	○	○
Are your feelings rather easily hurt?	○	○
Do you like going out a lot?	○	○
Do you occasionally have thoughts and ideas that you would not like other people to know about?	○	○
Are you sometimes bubbling over with energy and sometimes very sluggish?	○	○
Do you prefer to have few but special friends?	○	○
Do you daydream a lot?	○	○
When people shout at you, do you shout back?	○	○
Are you often troubled about feelings of guilt?	○	○
Are *all* your habits good and desirable ones?	○	○
Can you usually let yourself go and enjoy yourself a lot at a lively party?	○	○
Would you call yourself tense or "highly-strung"?	○	○
Do other people think of you as being very lively?	○	○

	YES	NO
28. After you have done something important, do you often come away feeling you could have done better?	○	○
29. Are you mostly quiet when you are with other people?	○	○
30. Do you sometimes gossip?	○	○
31. Do ideas run through your head so that you cannot sleep?	○	○
32. If there is something you want to know about, would you rather look it up in a book than talk to someone about it?	○	○
33. Do you get palpitations or thumping in your heart?	○	○
34. Do you like the kind of work that you need to pay close attention to?	○	○
35. Do you get attacks of shaking or trembling?	○	○
36. Would you always declare *everything* at the customs, even if you knew that you could never be found out?	○	○
37. Do you hate being with a crowd who play jokes on one another?	○	○
38. Are you an irritable person?	○	○
39. Do you like doing things in which you have to act quickly?	○	○
40. Do you worry about awful things that might happen?	○	○
41. Are you slow and unhurried in the way you move?	○	○
42. Have you ever been late for an appointment or work?	○	○
43. Do you have many nightmares?	○	○
44. Do you like talking to people so much that you never miss a chance of talking to a stranger?	○	○
45. Are you troubled by aches and pains?	○	○
46. Would you be very unhappy if you could not see lots of people most of the time?	○	○
47. Would you call yourself a nervous person?	○	○
48. Of all the people you know, are there some whom you definitely do not like?	○	○
49. Would you say that you were fairly self-confident?	○	○
50. Are you easily hurt when people find fault with you or your work?	○	○
51. Do you find it hard to really enjoy yourself at a lively party?	○	○
52. Are you troubled with feelings of inferiority?	○	○
53. Can you easily get some life into a rather dull party?	○	○
54. Do you sometimes talk about things you know nothing about?	○	○
55. Do you worry about your health?	○	○
56. Do you like playing pranks on others?	○	○
57. Do you suffer from sleeplessness?	○	○

PLEASE CHECK TO SEE THAT YOU HAVE ANSWERED ALL THE QUESTIONS

APPENDIX VI .: PILOT STUDY
DISTRIBUTION OF MIXED SEX SCORES FROM STUDENT GROUP
USED IN THE PILOT STUDY

Table 1: Distribution of Sense of Coherence Total Score



SOCTOT

Table 2: Distribution of Comprehensibility Scores

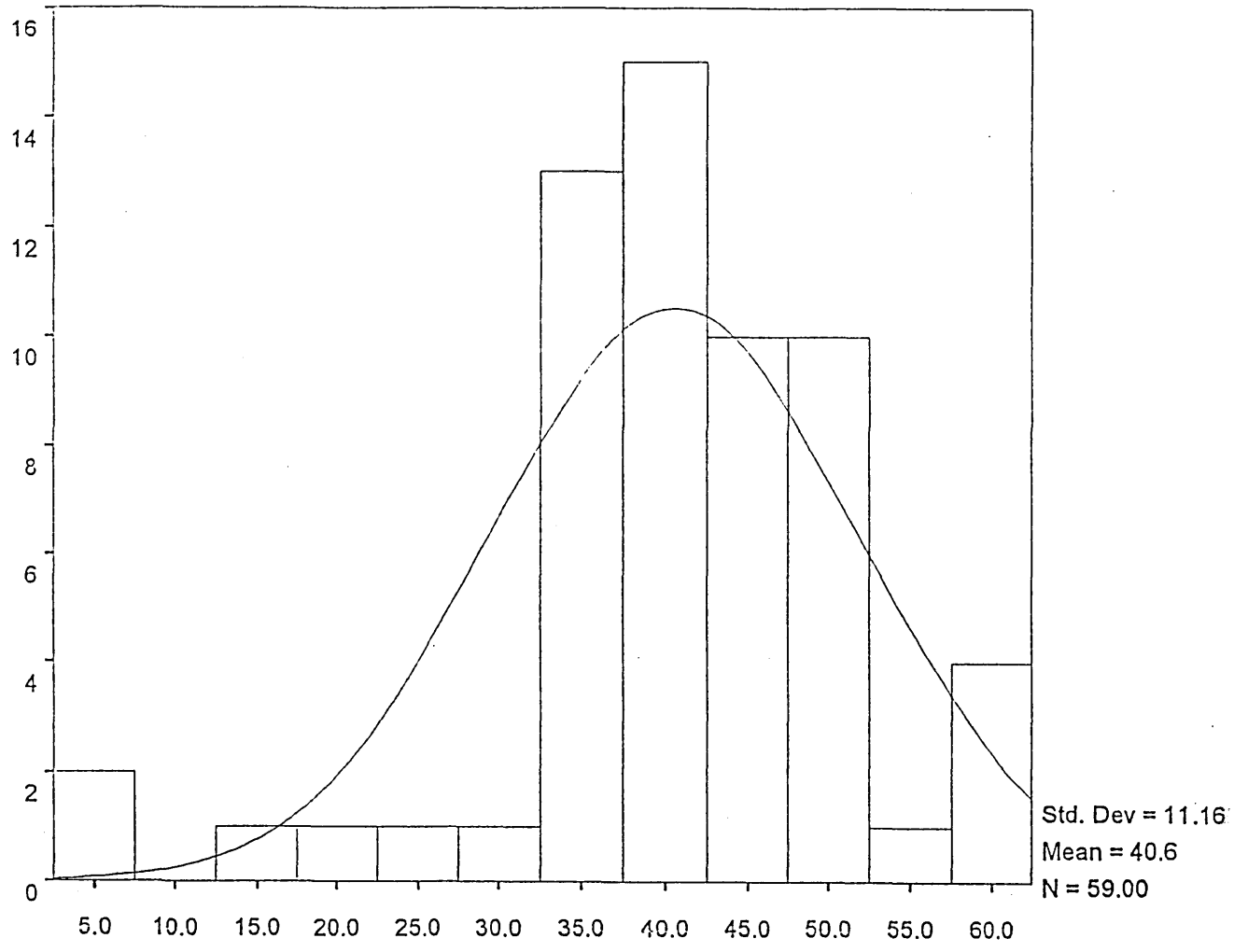


Table 3: Distribution of Manageability Scores

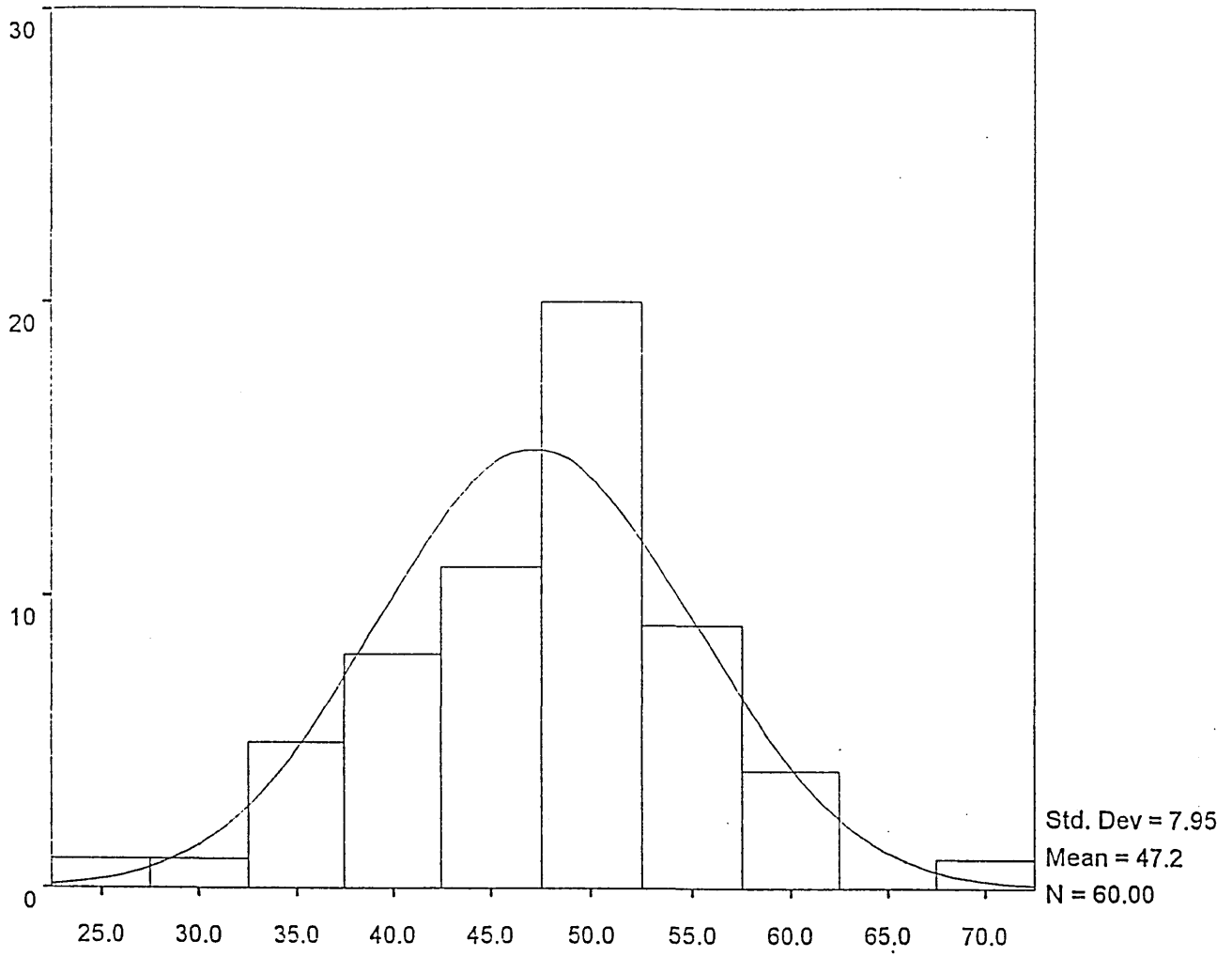


Table 4: Distribution of Meaningfulness Scores

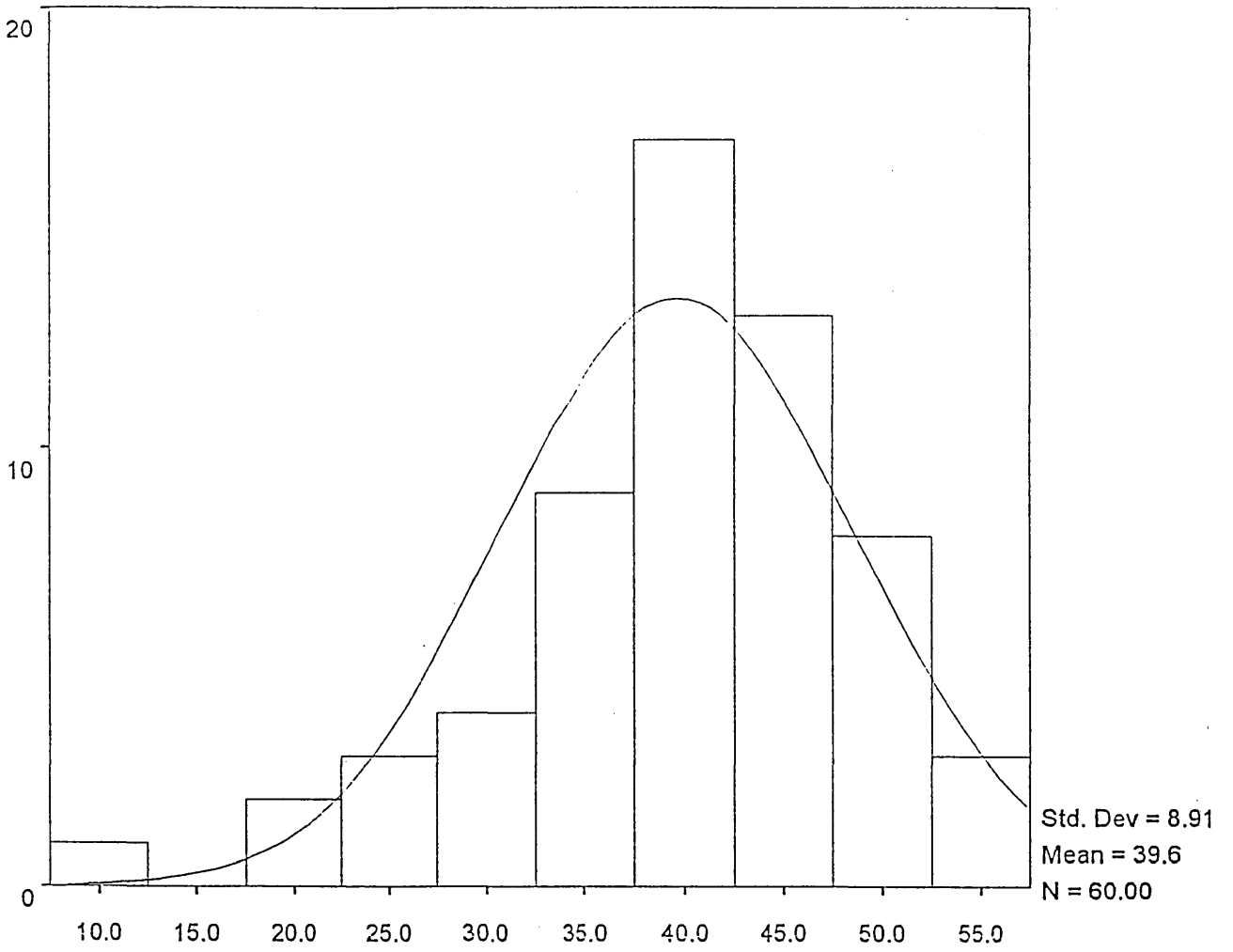


Table 5: Distribution of Hardiness Total Score (Dispositional Resilience Scale

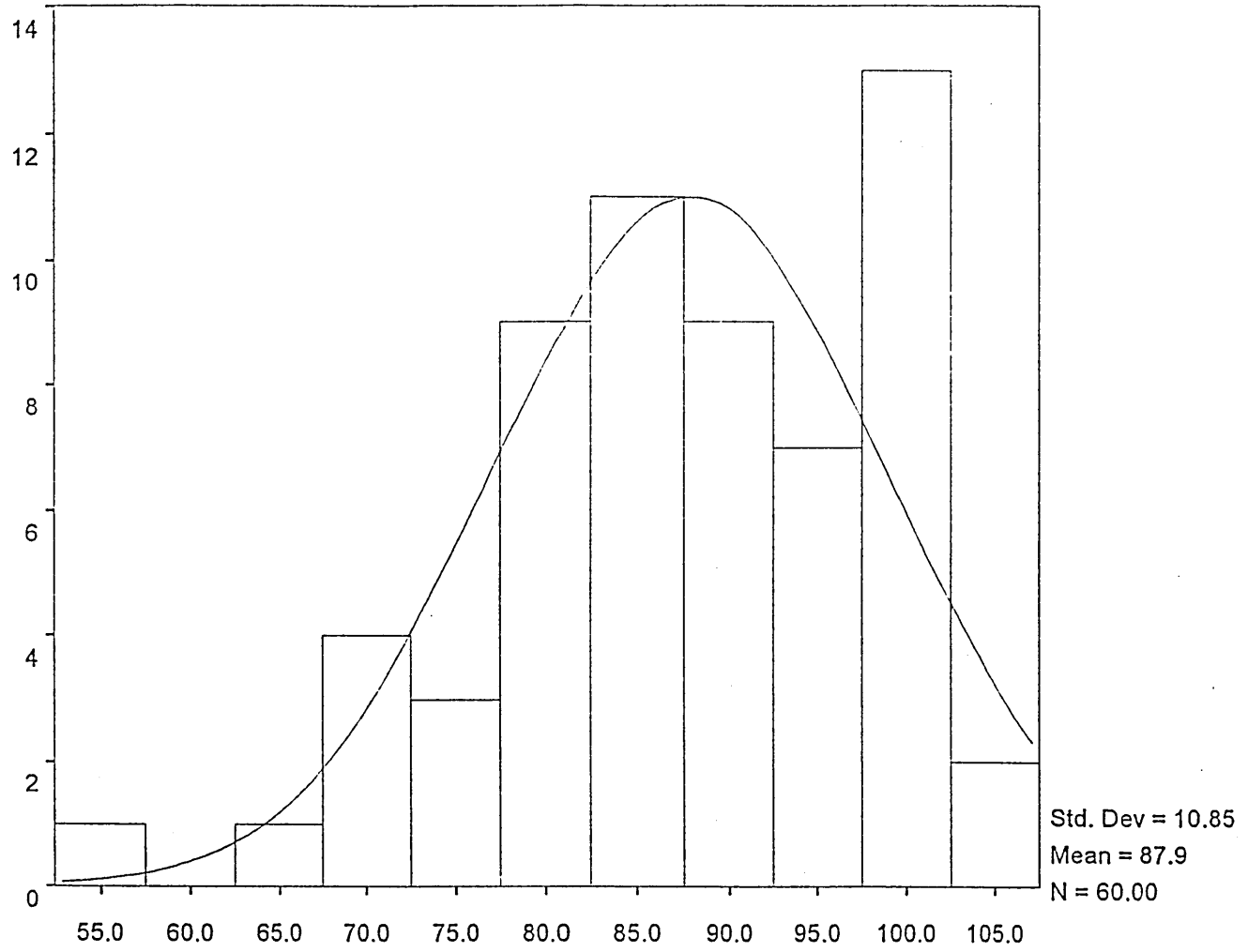


Table 6: Distribution of Control Scores

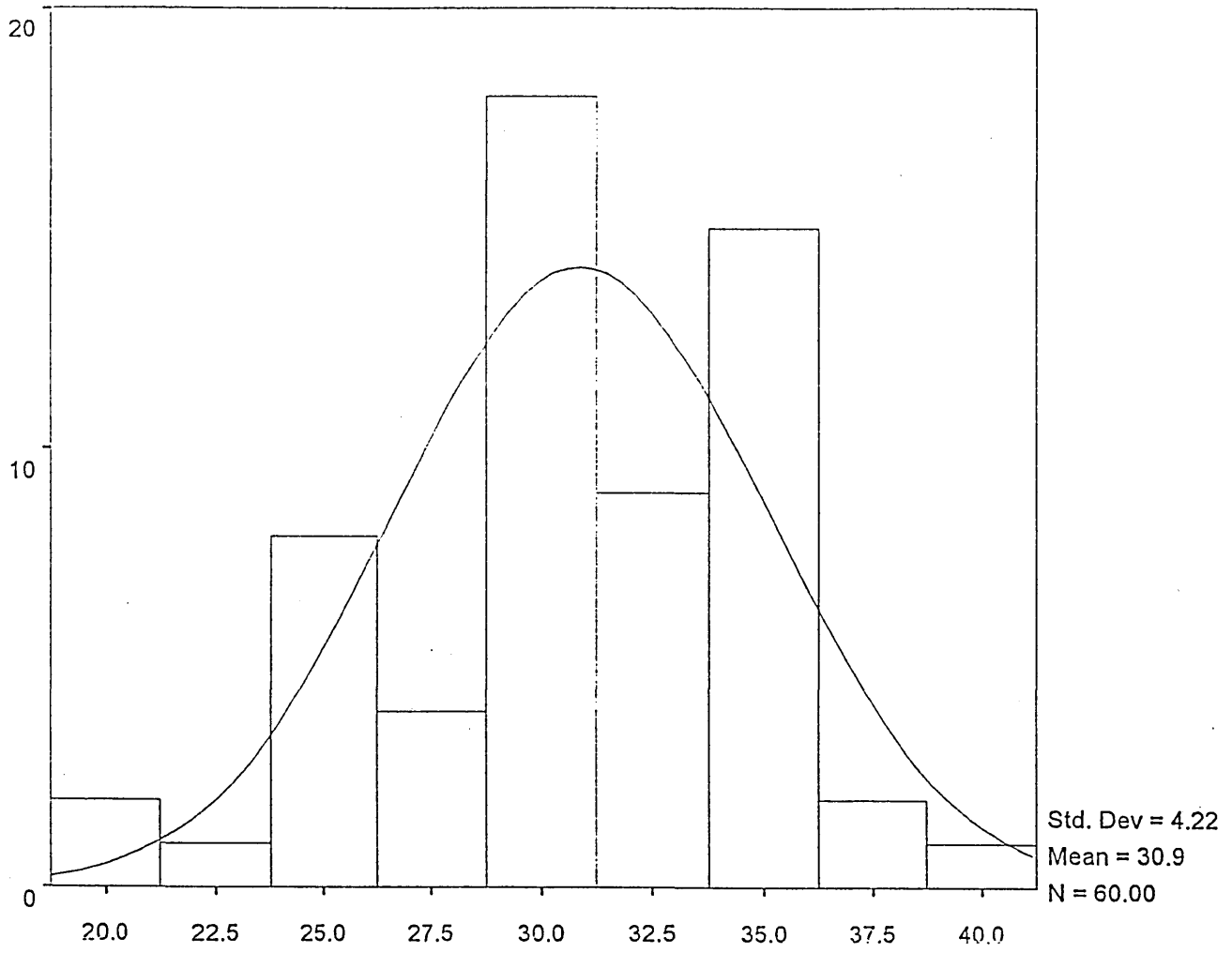


Table 7: Distribution of Challenge Scores

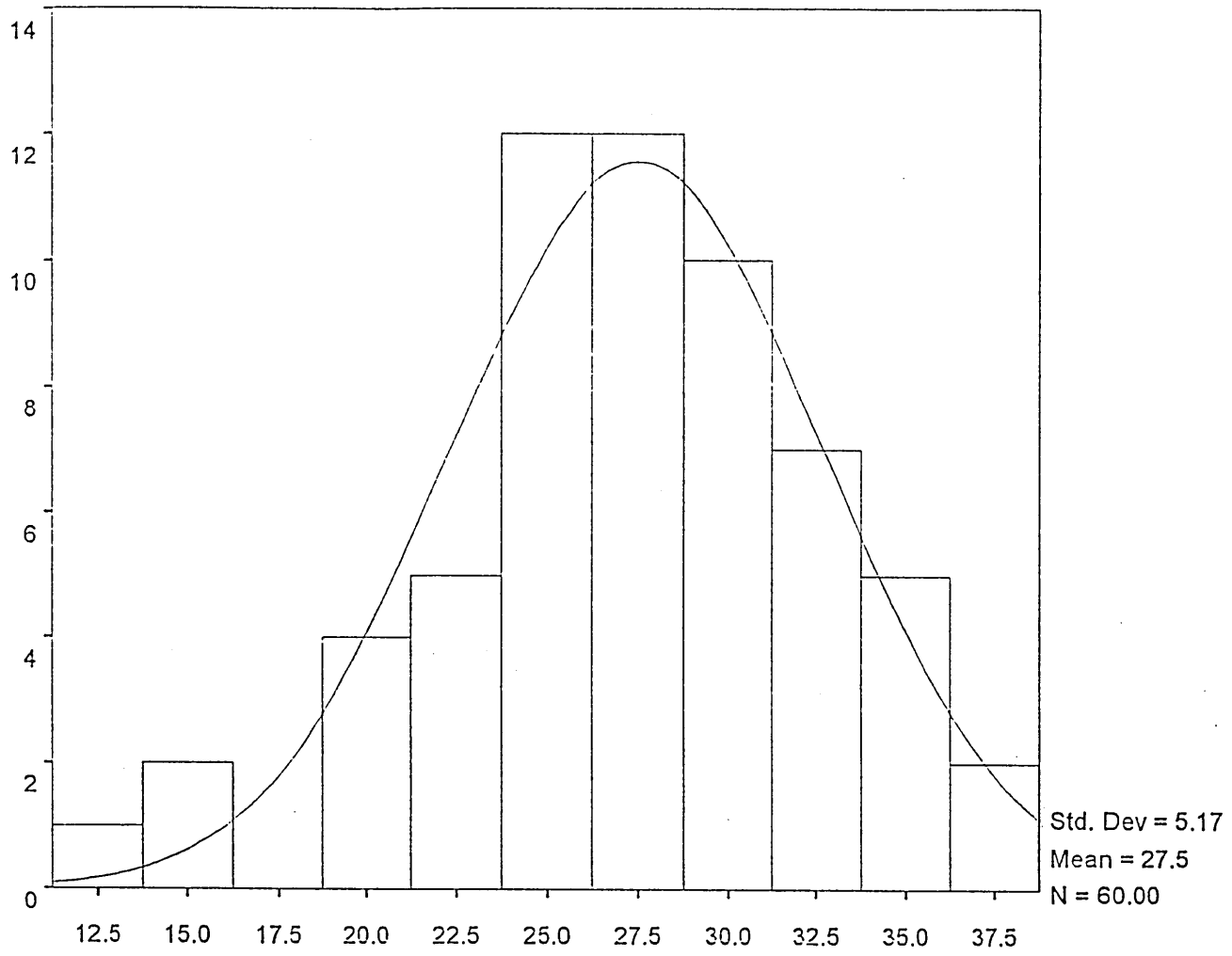


Table 8: Distribution of Commitment Scores

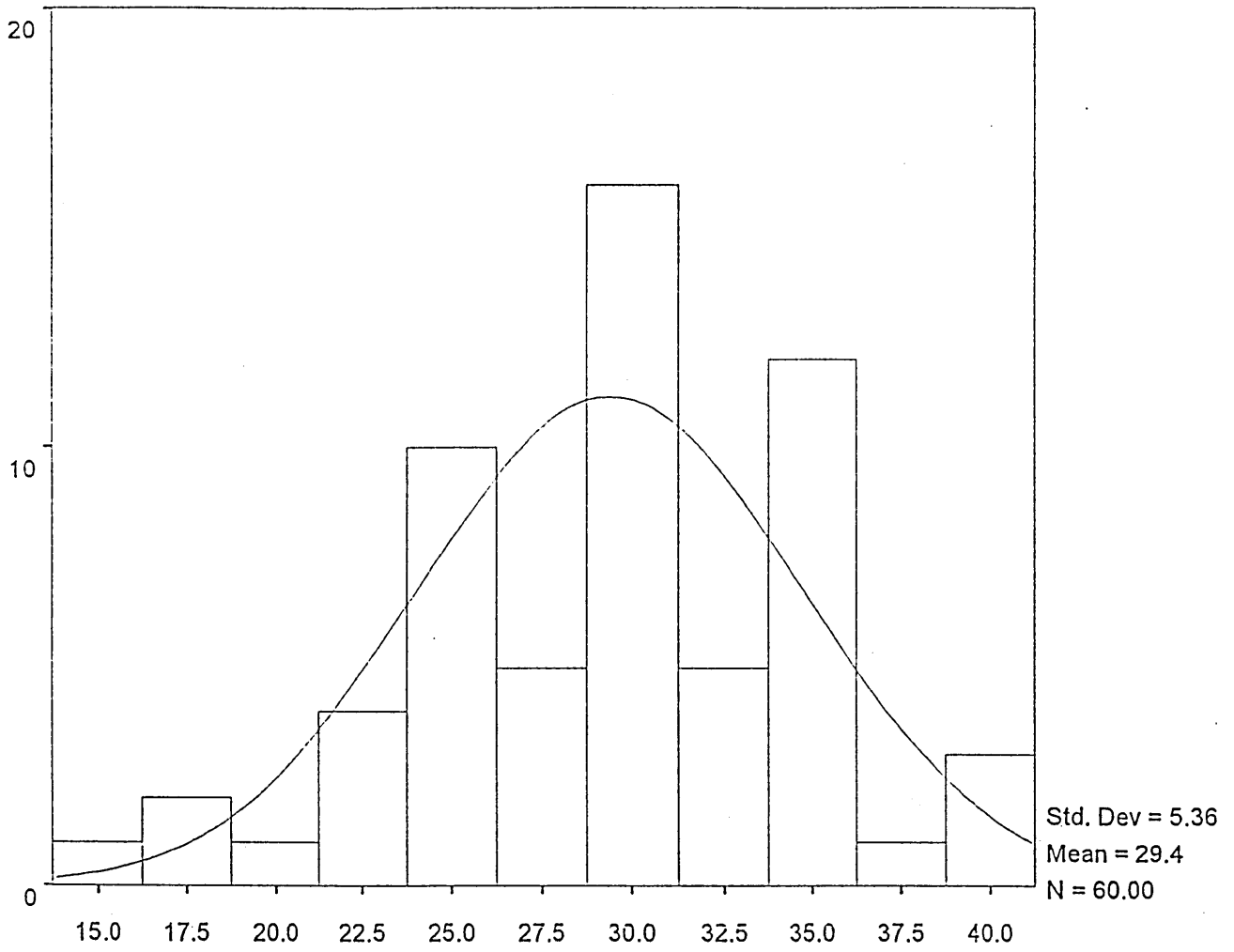
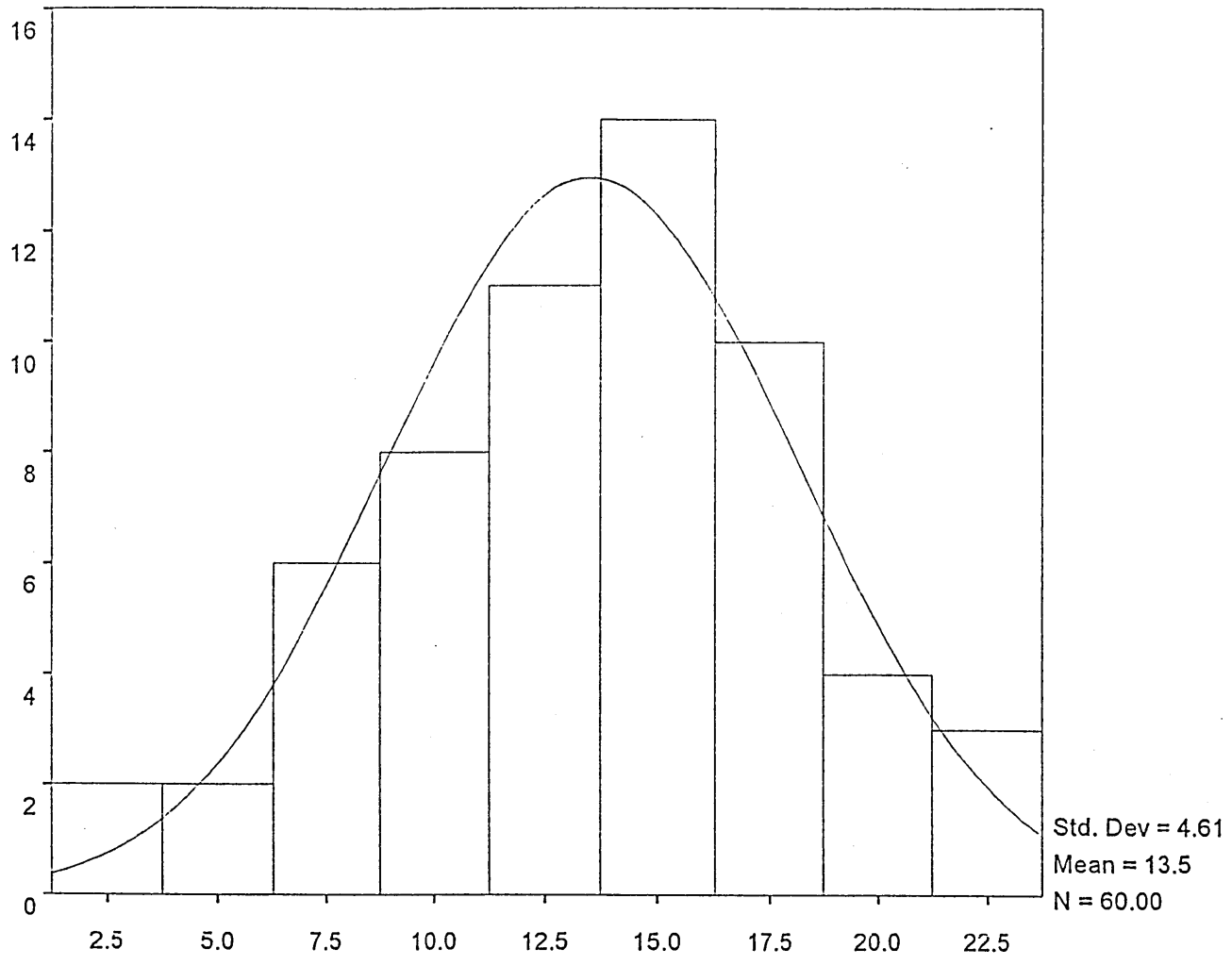
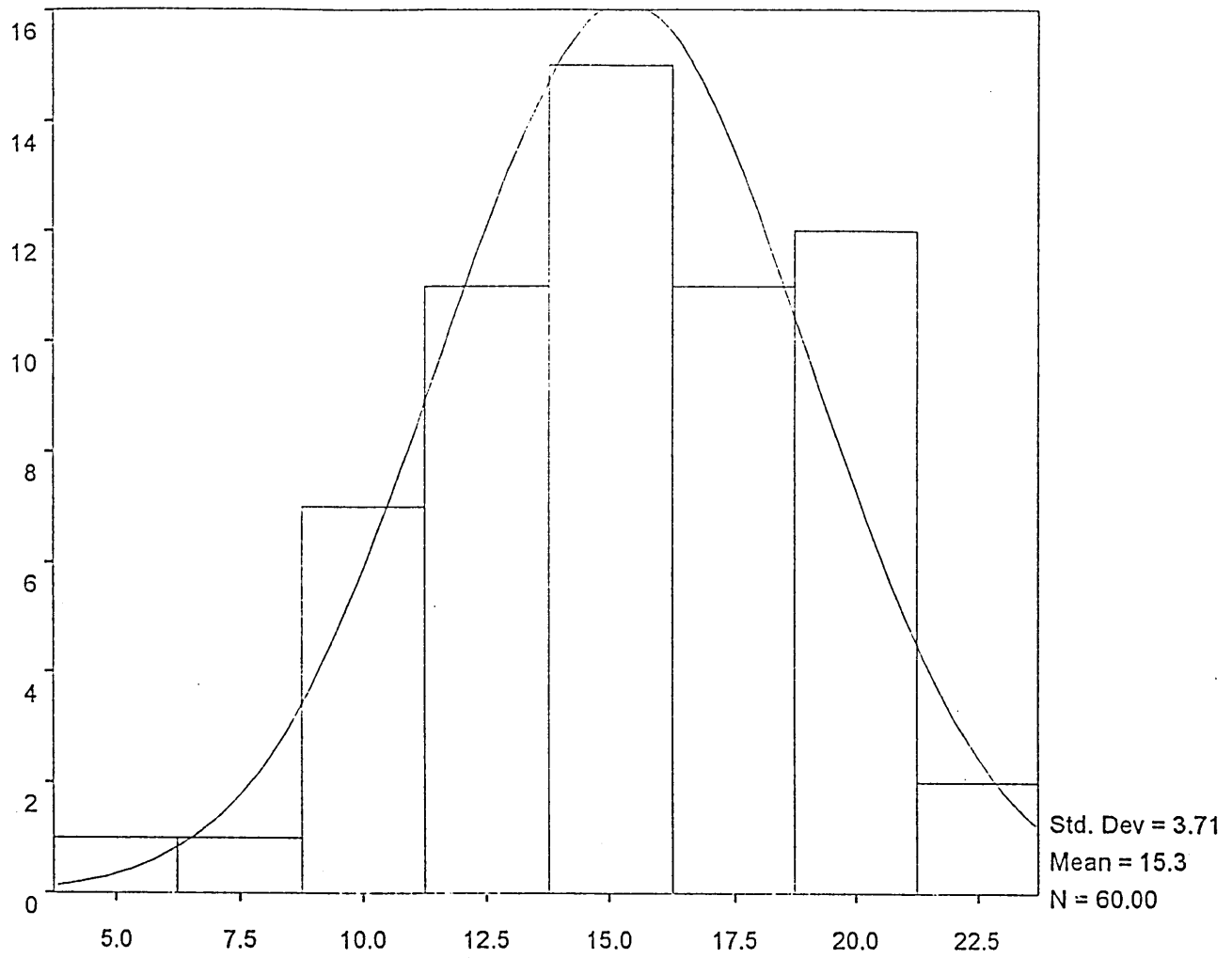


Table 13: Distribution of Neuroticism




16
14
12
10
8
6
4
2
0
5.0
7.5
10.0
12.5
15.0
17.5
20.0
22.5
Std. Dev = 3.71
Mean = 15.3
N = 60.00
EXTRO

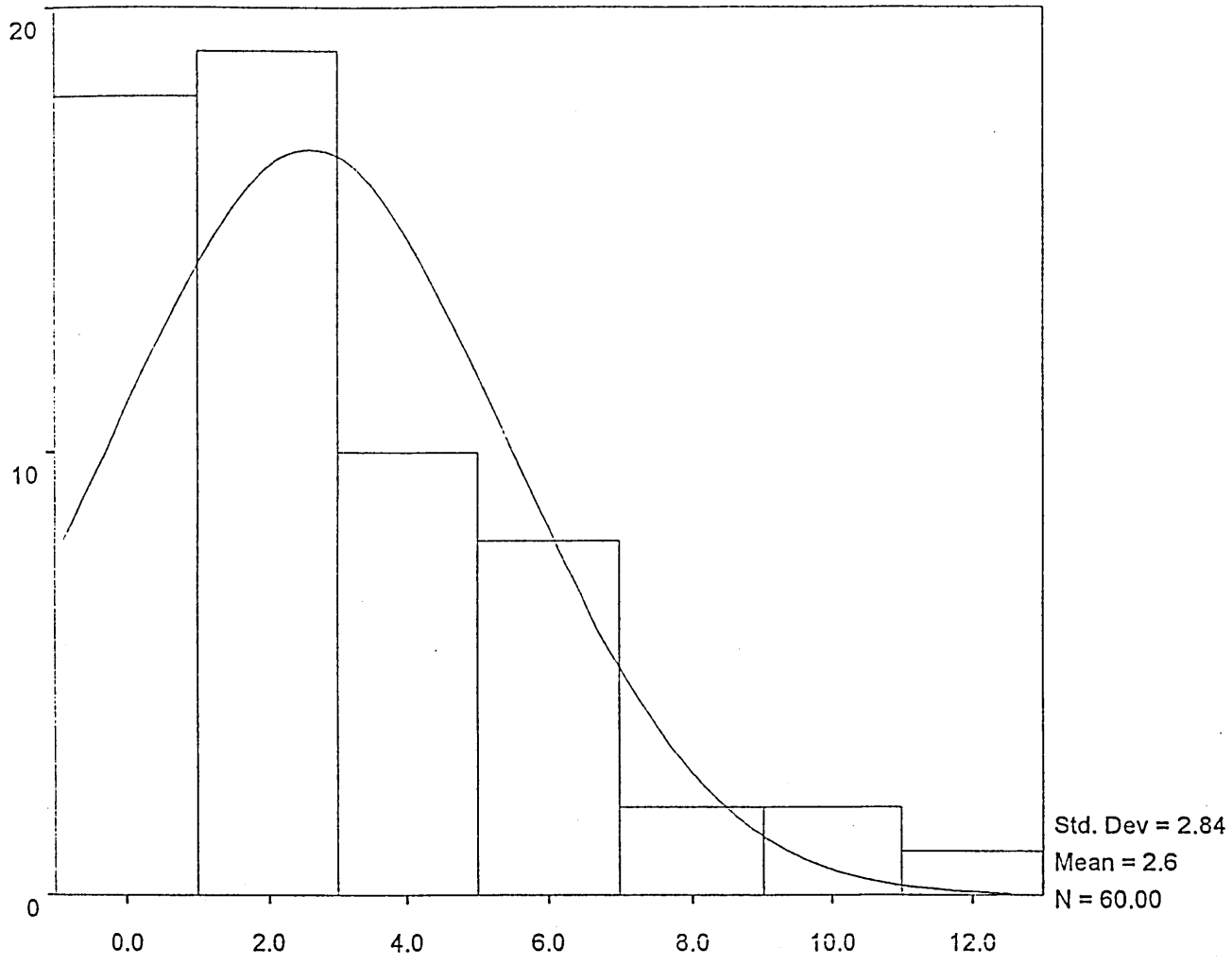

20
10
0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
Std. Dev = 2.84
Mean = 2.6
N = 60.00
GHQ

Table 16: Non Significant Results of Kendall's Correlation of Sense of Coherence Total Score and Separate Dimensions with Hardiness Total Score and Dimensions, General Health Questionnaire and Personality

	SOC	MAN	MEA	COM	H	CO	CM	CH	N	E
MAN										
MEA										
COM										
H				.27 **						
CO			.24 **	.22 **						
CM										
CH	.03	.17	.04	.06		.12	.12			
N					-.27 ** 2-tail	-.22 * 2-tail	-.28 ** 2-tail	-.12 2-tail		
E	.17 2-tail	.21 * 2-tail	.12 2-tail	.1 2-tail		.27 ** 2-tail	.24 ** 2-tail	.17 2-tail	-.21 *	
GHQ		-.21 *		-.25 **		-.23 **	-.23 **	-.18 *		-.11

Note: 40 men and 20 women were used for all the statistics above, except those involving Comprehensibility where the scores for 1 woman were missing.
SOC = Sense of Coherence total score, MAN = Manageability, MEA = Meaningfulness, COM = Comprehensibility, H = Dispositional Resilience Scale total hardiness score, CO = Control, CM = Commitment, CH = Challenge, N = Neuroticism, E = Extroversion and GHQ = General Health Questionnaire.
*p<.05. **p<.01. ***p <.001. After Bonferroni correction the alpha level for each test was changed to p<.001 in order to bring the overall alpha level back to p<.05.

APPENDIX VII STUDY 1, RELATIONSHIP OF HEALTH QUESTIONNAIRES TO PERSONALITY.
DISTRIBUTION OF MIXED SEX SCORES FROM STUDENT GROUP USED IN STUDY 1.

Table 1: Distribution of Sense of Coherence Total Score

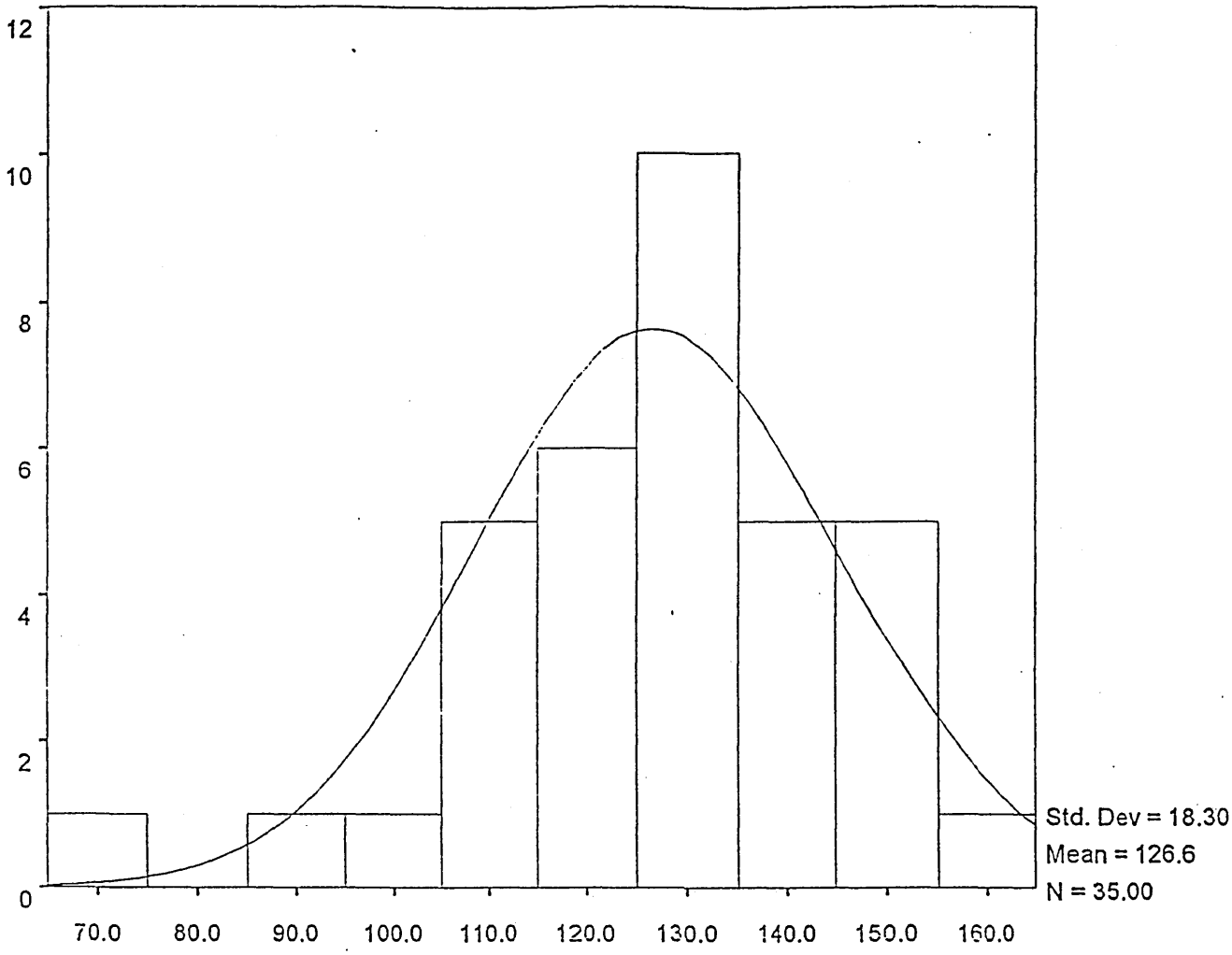


Table 2: Distribution of Comprehensibility Scores

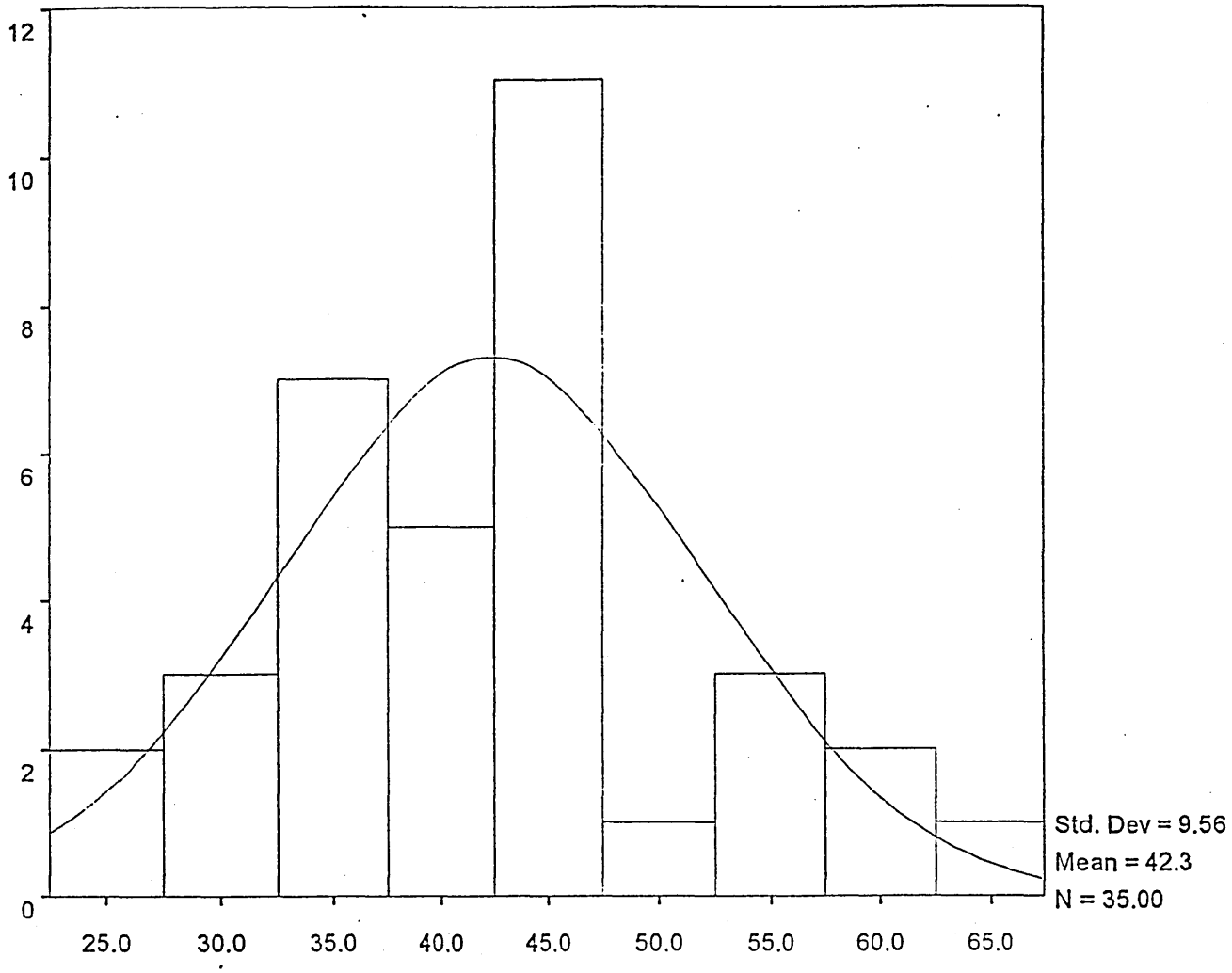


Table 3: Distribution of Manageability Scores

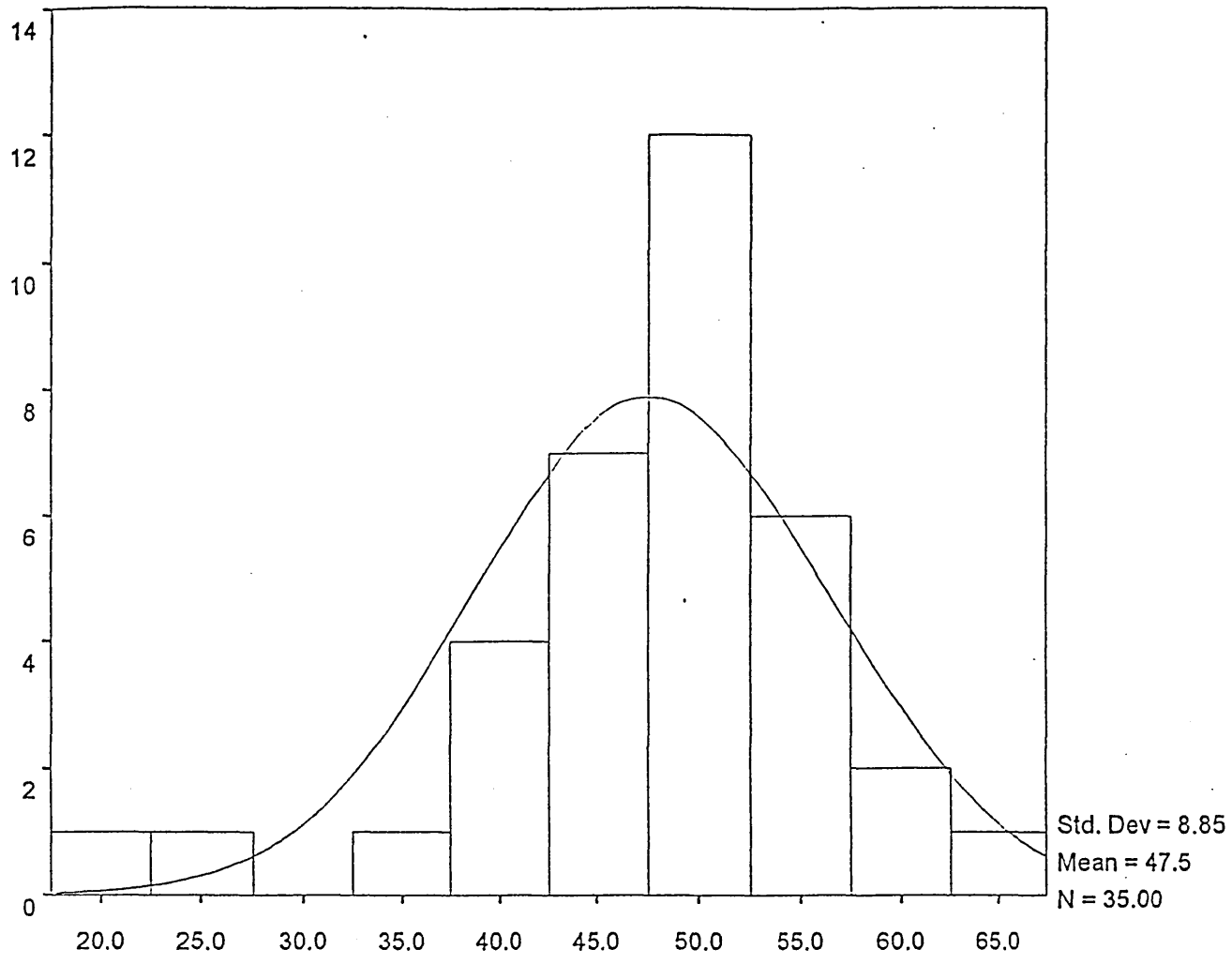


Table 4: Distribution of Meaningfulness Scores

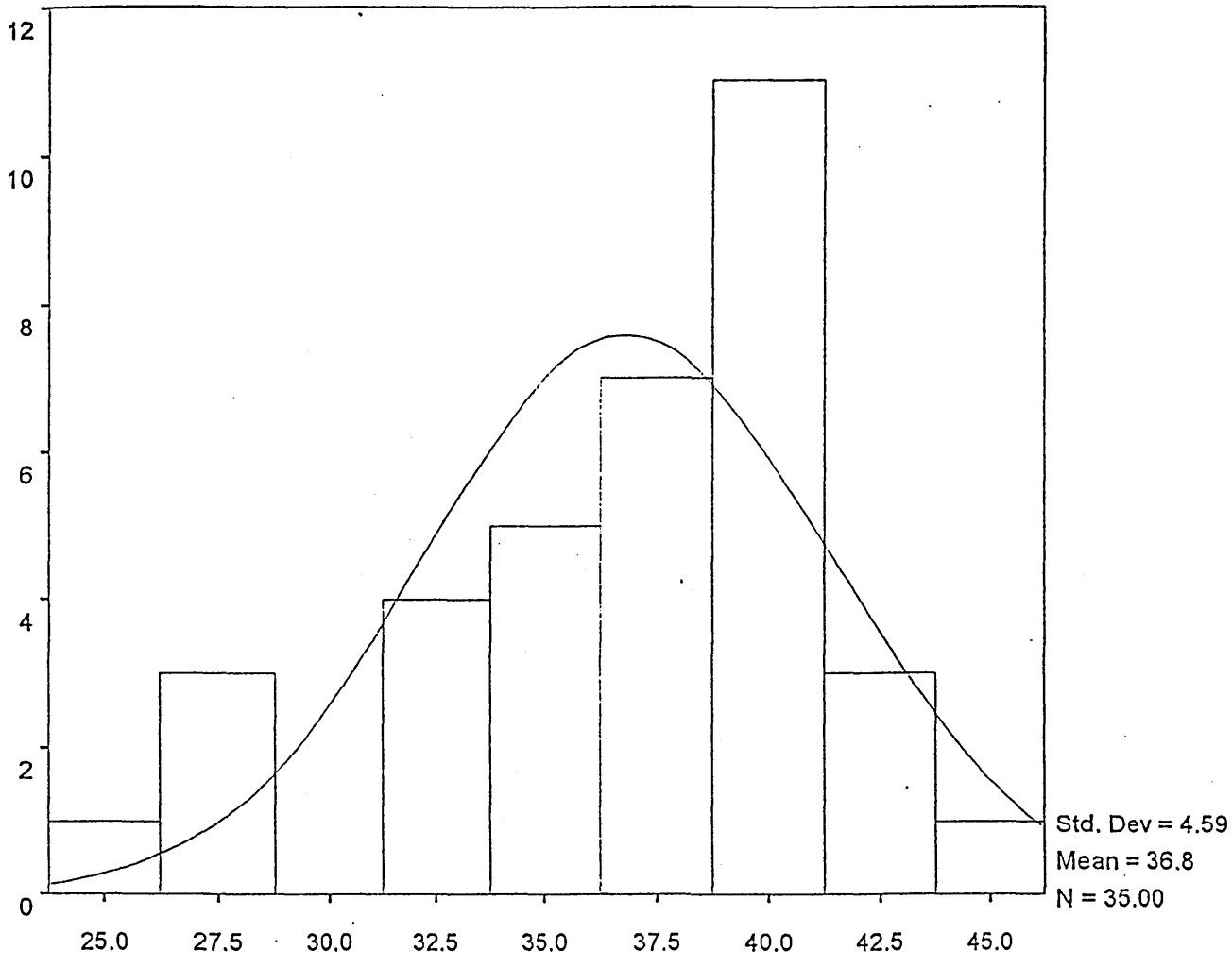
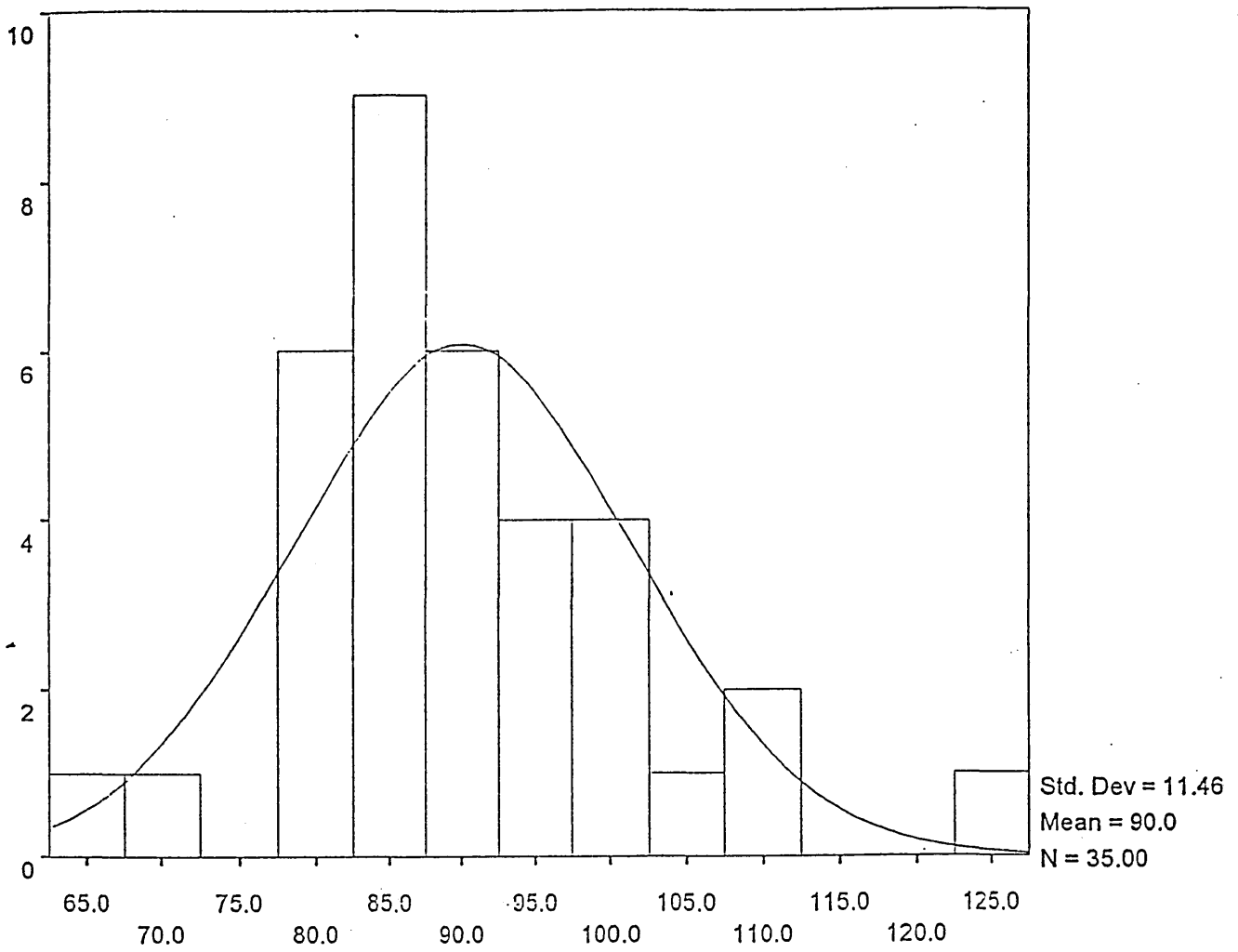
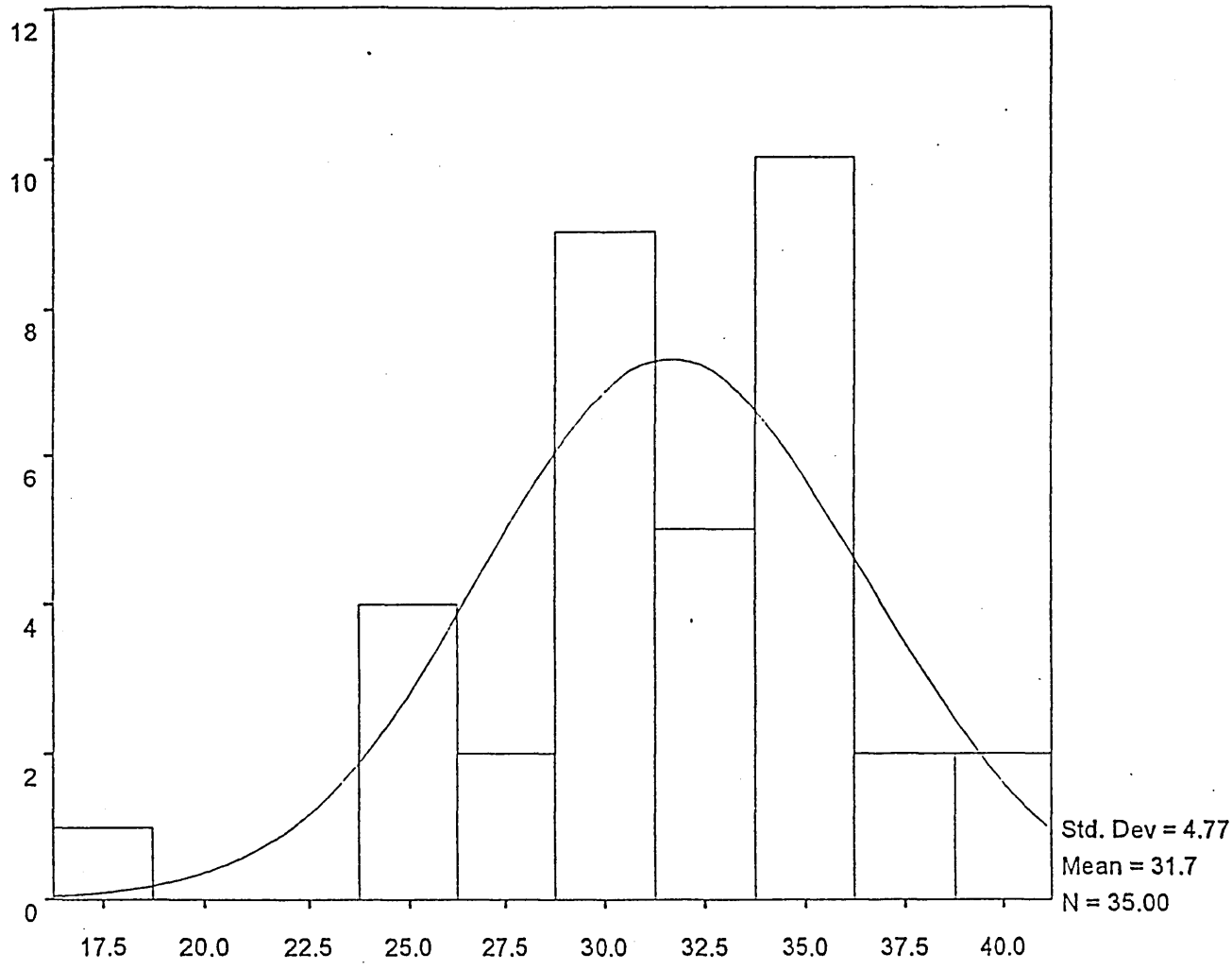


Table 5: Distribution of Hardiness Total Score (Dispositional Resilience Scale



HTOT

Table 6: Distribution of Control Scores



CO

Table 7: Distribution of Challenge Scores

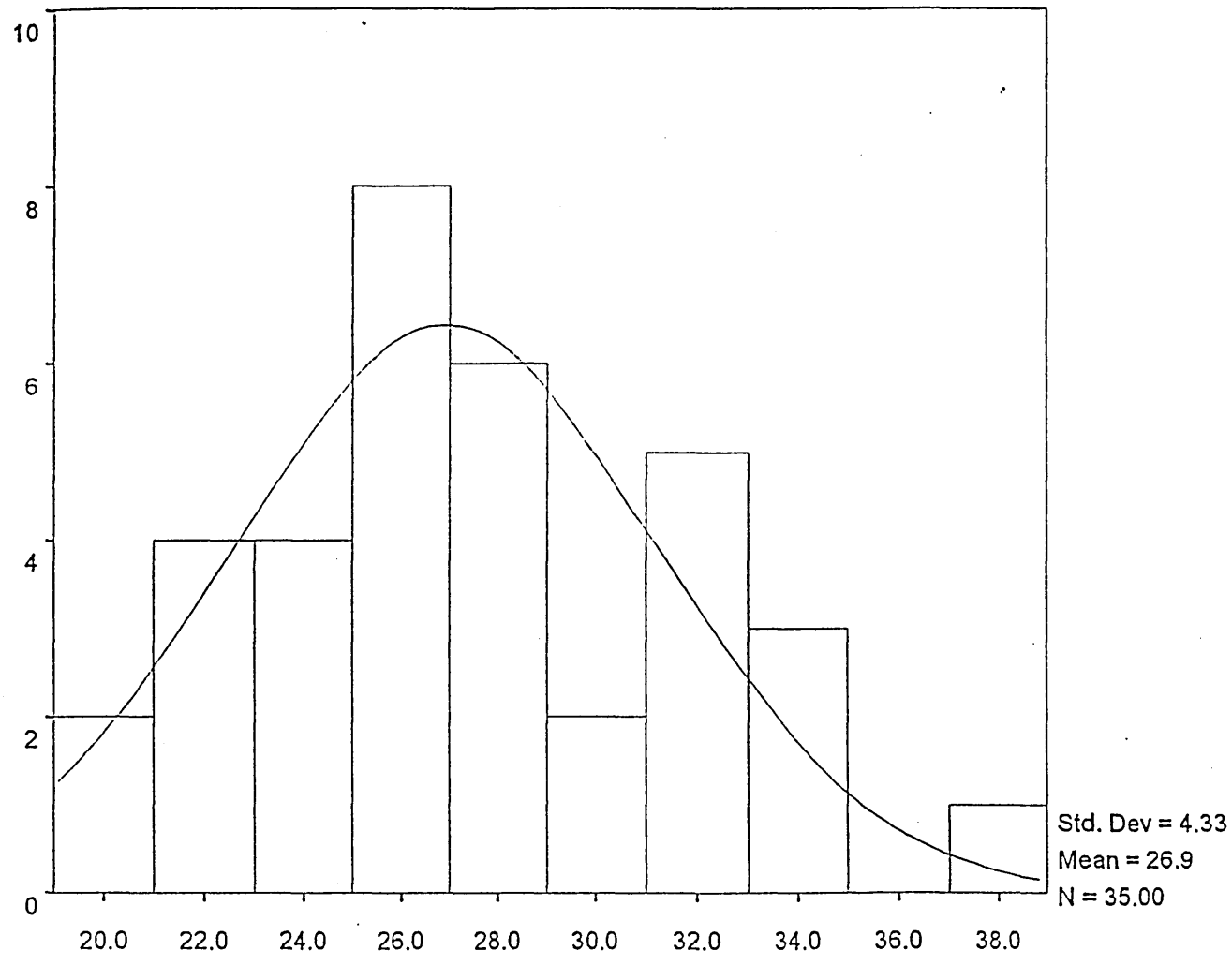
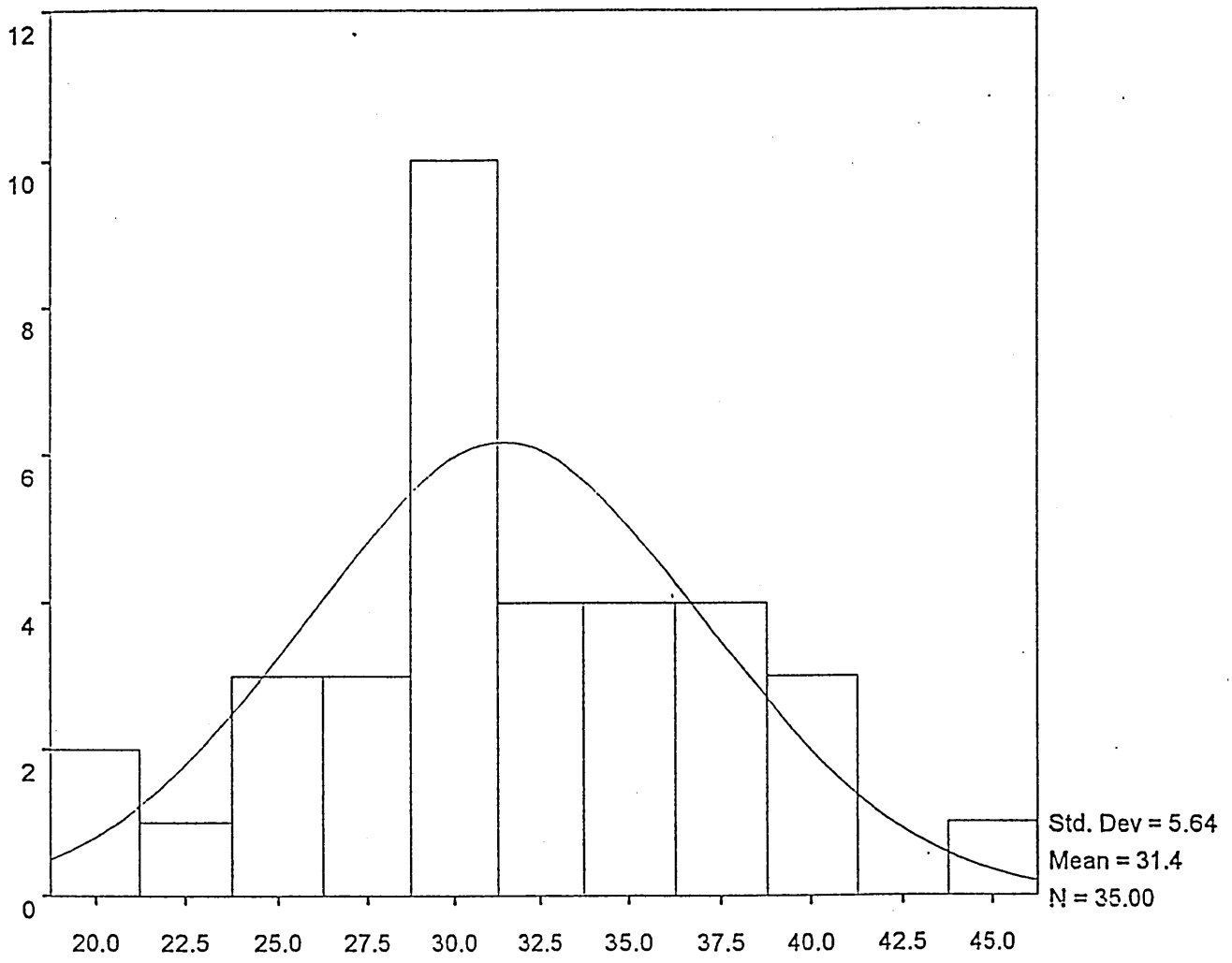


Table 8: Distribution of Commitment Scores



CM

Table 9: Distribution of General Health Questionnaire Scores

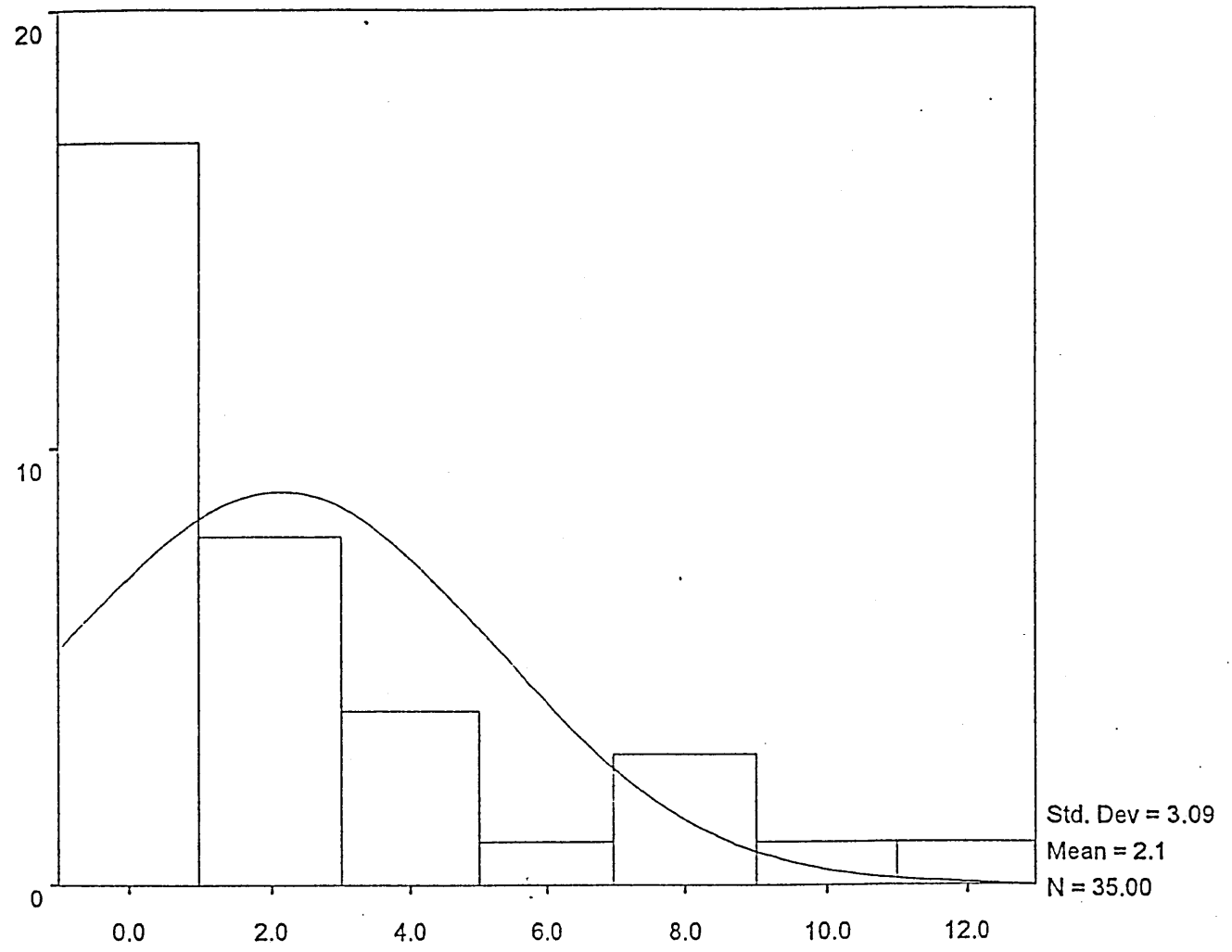


Table 10: Distribution of Age

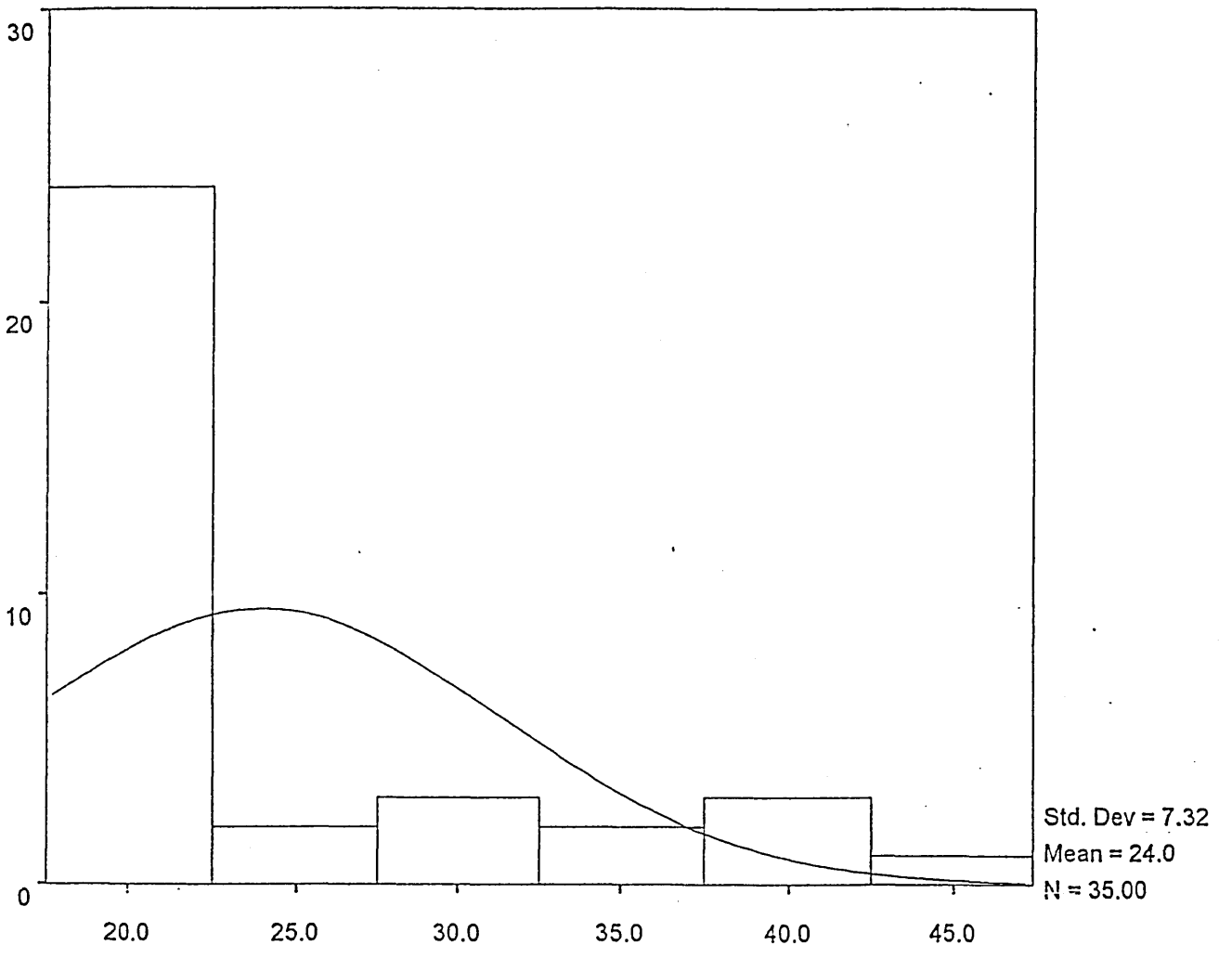
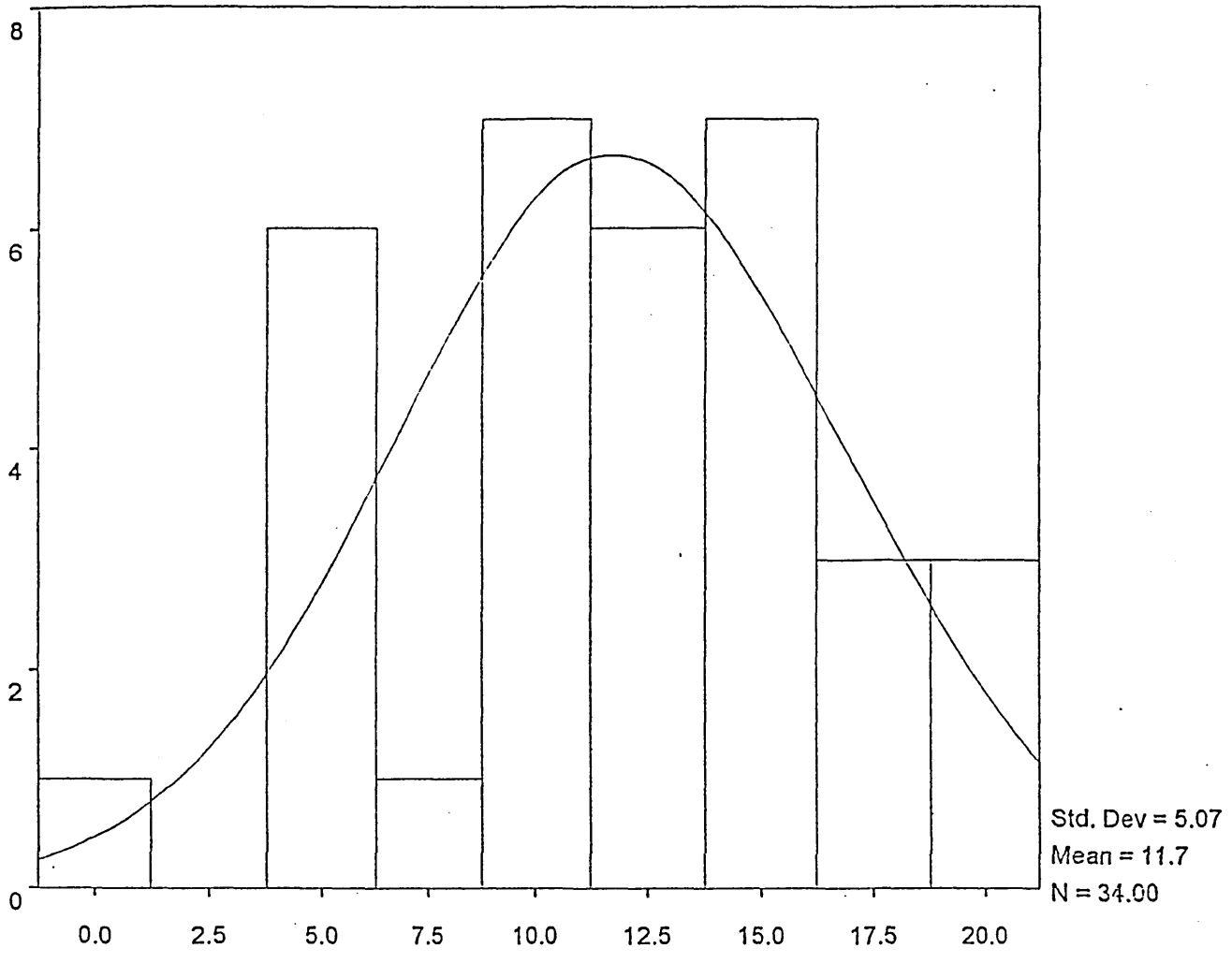
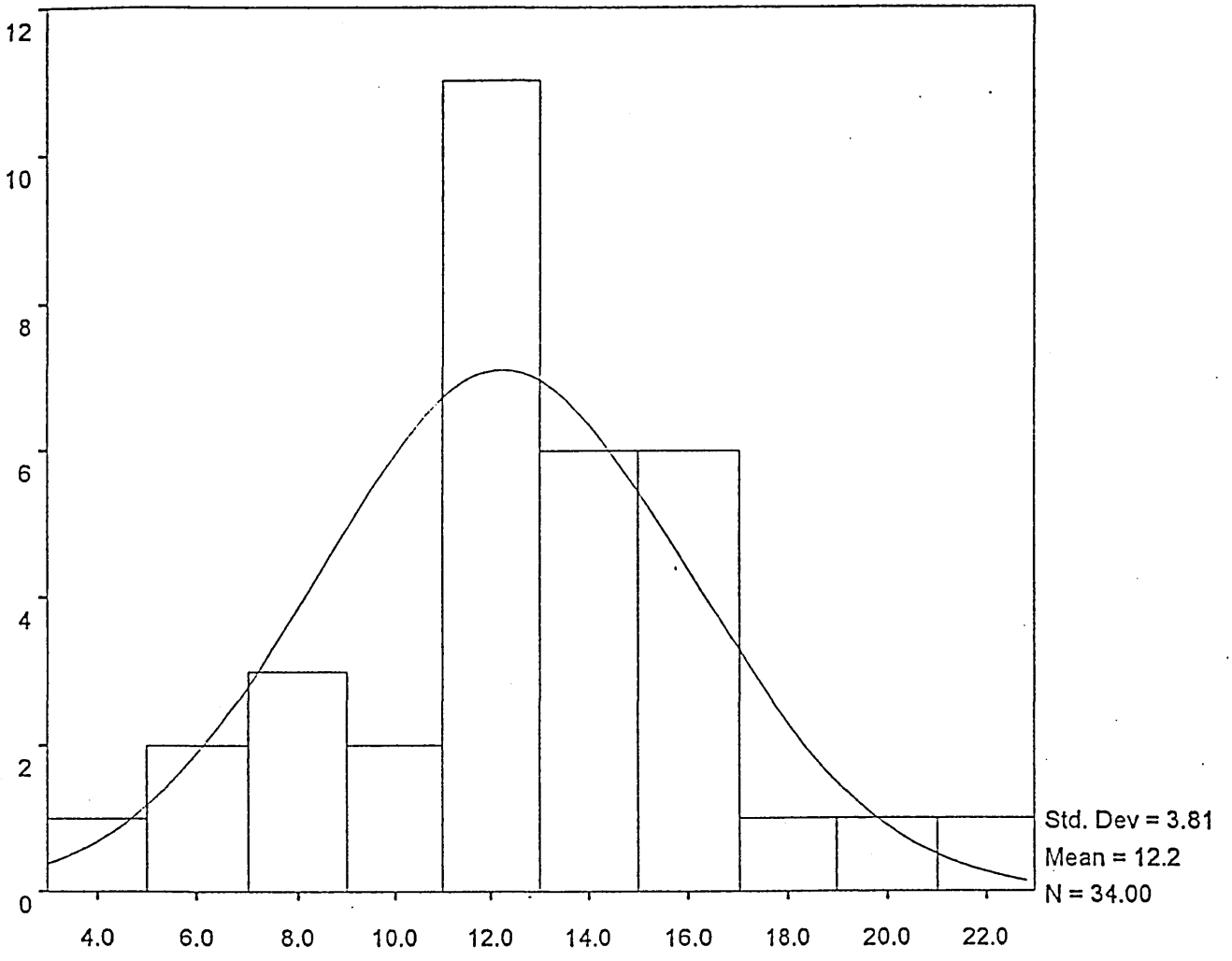


Table 11: Distribution of Neuroticism



NEURO

Table 12: Distribution of Extraversion



Kendall's Correlation (Tau) of Extroversion Scores With Individual Sense of Coherence Items

Q1, .27 p<.02	Q6, .19 p<.08	Q11, -.17 p<.1	Q16, .02 p<.45	Q21, .13 p<.15	Q26, -.12 p<.17
Q2, .09 p<.25	Q7, .07 p<.29	Q12, .03 p<.42	Q17, - .03 p<.41	Q22, .05 p<.36	Q27, - .22 p<.05
Q3, .11 p<.2	Q8, - .06 p<.32	Q13, .12 p<.18	Q18, .24 p<.04	Q23, .23 p<.05	Q28, - .03 p<.41
Q4, - .08 p< .27	Q9, .24 p<.04	Q14, - .17 p<.1	Q19, .23 p<.04	Q24, .19 p<.09	Q29, - .16 p<.11
Q5, .13 p< .17	Q10, .06 p<.31	Q15, .07 p<.3	Q20, - .15 p<.12	Q25, -.03 p<.42	

Note: The number of the Sense of Coherence item along with the correlation is displayed in each cell.

Kendall's Correlation (Tau) of Extroversion Scores With Individual Dispositional Resilience Scale Items

Q1, -.06 p<.34	Q8, .1 p<.23	Q15, -.07 p<.33	Q22, .19 p<.08	Q29, .02 p<.45	Q36, .1 p<.23	Q43, -.25 p<.04
Q2, .17 p<.12	Q9, 0 p<.49	Q16, -.38 p<.01	Q23, 0 p<.49	Q30, -.13 p<.16	Q37, -.1 p<.25	Q44, -.06 p<.35
Q3, 0 p<.48	Q10, - .37 p<.01	Q17, .06 p<.33	Q24, -.02 p<.45	Q31, -.05 p<.36	Q38, .03 p<.43	Q45, - .18 p<.1
Q4, .08 p< .3	Q11, -.02 p<.43	Q18, - .23 p<.05	Q25, -.04 p<.39	Q32, .1 p<.24	Q39, -.03 p<.09	
Q5, 0 p< .49	Q12, -.11 p<.22	Q19, .06 p<.32	Q26, -.04 p<.39	Q33, .06 p<.34	Q40, -.15 p<.13	
Q6, - .01 p< .48	Q13, .17 p<.11	Q20, - .06 p<.33	Q27, .05 p<.36	Q34, -.02 p<.43	Q41, -.26 p<.04	
Q7, .03 p< .43	Q14, .23 p<.05	Q21, .05 p<.35	Q28, - .2 p<.08	Q35, -.13 p<.17	Q42, -.07 p<.31	

Note: The number of the Dispositional Resilience Scale item along with the correlation is displayed in each cell.

Table VII-16: Kendall's Correlations of Sense of Coherence Questionnaire Items with Neuroticism

SOCQ Question	Tau and Significance Level	SOCQ Question	Tau and Siginificance Level
1	- 0.23	16	- 0.39 **
2	- 0.2	17	- 0.2
3	0	18	- 0.33 **
4	- 0.06	19	- 0.39 **
5	- 0.19	20	- 0.28 *
6	- 0.08	21	- 0.25 *
7	- 0.21	22	
8	- 0.32	23	- 0.07
9	- 0.26 *	24	- 0.18
10	- 0.01	25	- 0.2
11	0.41 **	26	- 0.23
12		27	- 0.34 **
13	- 0.34 **	28	- 0.37 **
14	0.3 *	29	- 0.22
15			

Note: 29 females and 5 males were used in the statistics above. * = $p<.05$, ** = $p<.01$. These results were not considered significant after a Bonferroni Correction was applied.

Table VII-17: Kendall's Correlations of Dispositional Resilience Scale Items with Neuroticism 105

Dispositional Resilience Scale Question	Tau and Significance Level	Dispositional Resilience Scale Question	Tau and Siginificance Level	Dispositional Resilience Scale Question	Tau and Siginificance Level
1	- 0.29 *	16	0.01	31	0.05
2	- 0.18	17	- 0.38 **	32	0.12
3	- 0.25	18	- 0.32 **	33	- 0.06
4	- 0.17	19	- 0.35 **	34	- 0.42 **
5	- 0.11	20	0.23	35	0
6	0.09	21	- 0.22	36	- 0.1
7	- 0.12	22	- 0.27 *	37	0.16
8	- 0.34 **	23	- 0.35 **	38	- 0.07
9	- 0.1	24	- 0.17	39	
10	0.01	25	- 0.22	40	- 0.03
11	0	26	- 0.12	41	- 0.25
12	0.1	27	0.11	42	- 0.07
13	- 0.39 **	28	- 0.18	43	0.05
14	- 0.26 *	29	0.04	44	0.19
15	- 0.29 **	30		45	- 0.3 **

Note: 29 females and 5 males were used in the statistics above. These results are considered non significant after a Bonferroni correction was applied * $p<.05$. ** $p<.01$.

APPENDIX VIII: STUDY 3, EFFECT OF SEX DIFFERENCES ON INTERPRETATION OF SCORES ON THE SENSE OF COHERENCE QUESTIONNAIRE AND THE DISPOSITIONAL RESILIENCE SCALE.

NON SIGNIFICANT MANN-WHITTNEY - U RESULTS FOR SEX DIFFERENCES IN SCORES ON THE TEST BATTERY.

Non Significant Sex Differences in Scores on the Battery Among Those With High or Low Scores on Sense of Coherence, Hardiness, Personality and General Health Questionnaire

Table 1: General Health Questionnaire Score 0 - 5

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	116 (N=57)	123(N=186)	4968
Commitment	128 (N=57)	120(N=186)	4944
Control	124 (N=57)	121(N=186)	5143
Hardiness Total	121 (N=57)	122(N=186)	5243
Comprehensiblty	121 (N=57)	124(N=189)	5252
Manageability	115 (N=57)	125(N=189)	4935
Meaningfulness	NA (N=57)	NA	NA
Sense of Coherence Total	114 (N=57)	126(N=189)	4898
Neuroticism	116 (N=57)	122(N=184)	4996
Extraversion	111 (N=57)	124(N=184)	4678
Age	122 (N=54)	120(N=186)	4916
General Health Questionnaire	143 (N=57)	117(N=189)	4234

Table 2: General Health Questionnaire Score 6-12

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	30 (N=10)	29 (N=47)	229
Commitment	32 (N=10)	28 (N=47)	207
Control	33 (N=10)	28 (N=47)	198
Hardiness Total	32 (N=10)	28 (N=47)	200
Comprehensiblty	39 (N=10)	29 (N=50)	164
Manageability	37 (N=10)	29 (N=50)	187
Meaningfulness	23 (N=10)	32 (N=50)	178
Sense of Coherence Total	37 (N=10)	29 (N=50)	181
Neuroticism	NA	NA	NA
Extraversion	31 (N=10)	30 (N=50)	243
Age	40 (N=10)	28 (N=50)	151
General Health Questionnaire	25 (N=10)	32 (N=50)	192

Table 3: Extraversion Scores < 12

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	69 (N=36)	64 (N=94)	1558
Commitment	72 (N=36)	62(N=94)	1444
Control	NA	NA	NA
Hardiness Total	75 (N=36)	94(N=94)	1348
Comprehensiblty	73 (N=36)	63(N=95)	1460
Manageability	NA	NA	NA
Meaningfulness	60 (N=36)	68 (N=95)	1502
Sense of Coherence Total	73 (N=36)	63(N=95)	1450
Neuroticism	NA	NA	NA
Extraversion	NA	NA	NA
Age	NA	NA	NA
General Health Questionnaire	66 (N=36)	66(N=95)	1699

Table 4: Extraversion Scores > 12

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	83 (N=31)	84 (N=135)	2071
Commitment	87 (N=31)	83 (N=135)	1978
Control	76 (N=31)	85 (N=135)	1880
Hardiness Total	78 (N=31)	85 (N=135)	1937
Comprehensiblty	83 (N=31)	86 (N=139)	2082
Manageability	75 (N=31)	88 (N=139)	1847
Meaningfulness	74 (N=31)	87 (N=138)	1817
Sense of Coherence Total	77 (N=31)	87 (N=139)	1908
Neuroticism	91 (N=31)	84 (N=139)	1994
Extraversion	86 (N=31)	85 (N=139)	2124
Age	82 (N=31)	86 (N=139)	2036
General Health Questionnaire	91 (N=31)	84 (N=139)	1992

Table 5: Neuroticism Scores < 12

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	59 (N=36)	73(N=102)	1470
Commitment	65 (N=36)	71(N=102)	1666
Control	76 (N=36)	67(N=102)	1603
Hardiness Total	63 (N=36)	71(N=102)	1609
Comprehensiblty	70 (N=36)	70(N=103)	1841
Manageability	64 (N=36)	72(N=103)	1653
Meaningfulness	NA	NA	NA
Sense of Coherence Total	62 (N=36)	73(N=103)	1579
Neuroticism	67 (N=36)	71(N=103)	1579
Extraversion	NA	NA	NA
Age	79 (N=36)	67(N=103)	1536
General Health Questionnaire	NA	NA	NA

Table 6: Neuroticism Scores > 12

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	86 (N=31)	78 (N=127)	1754
Commitment	88 (N=31)	77 (N=127)	1710
Control	75 (N=31)	81 (N=127)	1826
Hardiness Total	84 (N=31)	78 (N=127)	1828
Comprehensiblty	80 (N=31)	82 (N=131)	1978
Manageability	80 (N=31)	82 (N=131)	1984
Meaningfulness	73 (N=31)	83 (N=130)	1761
Sense of Coherence Total	75 (N=31)	83 (N=131	1838
Neuroticism	71 (N=31)	84 (N=131)	1693
Extraversion	94 (N=31)	79 (N=131)	1651
Age	73 (N=28)	80 (N=128)	1639
General Health Questionnaire	78 (N=31)	82 (N=131)	1933

Table7: Comprehensibility < 31

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	68 (N=28)	67(N=106)	1469
Commitment	66 (N=28)	68(N=106)	1434
Control	69 (N=28)	67(N=106)	1443
Hardiness Total	67 (N=28)	67(N=106)	1482
Comprehensiblty	68 (N=28)	70(N=111)	1493
Manageability	68 (N=28)	70(N=111)	1490
Meaningfulness	NA	NA	NA
Sense of Coherence Total	62 (N=28)	72(N=111)	1329
Neuroticism	NA	NA	NA
Extraversion	81 (N=28)	66(N=109)	1198
Age	69 (N=28)	68(N=108)	1496
General Health Questionnaire	71 (N=28)	70(N=111)	1532

Table 8: Comprehensibility >31

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	79 (N=39)	85 (N=127)	2304
Commitment	92 (N=39)	81 (N=127)	2136
Control	91 (N=39)	81 (N=127)	2166
Hardiness Total	85 (N=39)	83 (N=127)	2395
Comprehensiblty	88 (N=88)	83 (N=128)	2352
Manageability	82 (N=39)	84 (N=128)	2431
Meaningfulness	76 (N=39)	86 (N=127)	2177
Sense of Coherence Total	82 (N=39)	85 (N=128)	2406
Neuroticism	75 (N=75)	85(N=125)	2140
Extraversion	NA	NA	NA
Age	92 (N=36)	80 (N=128)	1964
General Health Questionnaire	94(N=39)	81(N=128)	2093

Table 9: Manageability < 48

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	68 (N=30)	65(N=101)	1451
Commitment	67 (N=30)	65(N=101)	1468
Control	65 (N=30)	66(N=101)	1490
Hardiness Total	67 (N=30)	65(N=101)	1468
Comprehensiblty	69 (N=30)	68(N=106)	1568
Manageability	72 (N=30)	67(N=106)	1468
Meaningfulness	NA	NA	NA
Sense of Coherence Total	65 (N=30)	69(N=106)	1489
Neuroticism	NA	NA	NA
Extraversion	76(N=30)	65(N=104)	1296
Age	64 (N=30)	68(N=103)	1453
General Health Questionnaire	68 (N=30)	69(N=106)	1566

Table 10: Manageability >48

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	81 (N=37)	86 (N=132)	2289
Commitment	95 (N=37)	82 (N=132)	2050
Control	NA	NA	NA
Hardiness Total	93 (N=37)	83 (N=132)	2139
Comprehensiblty	91 (N=37)	84 (N=133)	2269
Manageability	89 (N=37)	84 (N=133)	2331
Meaningfulness	79 (N=37)	87 (N=132)	2222
Sense of Coherence Total	87 (N=37)	85 (N=133)	2403
Neuroticism	75 (N=37)	86 (N=130)	2091
Extraversion	NA	NA	NA
Age	98 (N=34)	80 (N=133)	1781
General Health Questionnaire	94 (N=37)	83 (N=133)	2131

Table 11: Meaningfulness Scores < 35

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	59 (N=32)	65(N=94)	1372
Commitment	61 (N=32)	64(N=94)	1434
Control	64 (N=32)	63(N=94)	1490
Hardiness Total	61(N=32)	64(N=94)	1411
Comprehensiblty	68 (N=32)	64(N=98)	1472
Manageability	71(N=32)	64(N=98)	1397
Meaningfulness	45 (N=32)	72 (N=98)	929
Sense of Coherence Total	67 (N=32)	65(N=98)	1532
Neuroticism	52 (N=32)	69(N=97)	1152
Extraversion	65 (N=32)	65(N=97)	1534
Age	85 (N=32)	59(N=98)	955
General Health Questionnaire	70 (N=32)	64(N=98)	1426

Table 12: Meaningfulness Scores > 35

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	88 (N=35)	87 (N=138)	2366
Commitment	NA	NA	NA
Control	99 (N=35)	84 (N=91)	1988
Hardiness Total	100 (N=35)	84 (N=138)	1954
Comprehensiblty	98 (N=35)	85 (N=140)	2107
Manageability	90 (N=35)	87 (N=140)	2388
Meaningfulness	82 (N=35)	89 (N=140)	2254
Sense of Coherence Total	93 (N=35)	87 (N=140)	2266
Neuroticism	79 (N=35)	88 (N=136)	2125
Extraversion	79 (N=24)	88 (N=136)	2143
Age	76 (N=32)	87 (N=137)	1922
General Health Questionnaire	89 (N=35)	88 (N=140)	2417

Table 13: Sense of Coherence Scores < 130

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	70 (N=28)	68(N=109)	1487
Commitment	68 (N=28)	69(N=109)	1495
Control	68 (N=28)	69(N=109)	1498
Hardiness Total	68 (N=28)	69(N=109)	1514
Comprehensiblty	68 (N=28)	72(N=114)	1493
Manageability	71 (N=28)	72(N=114)	1580
Meaningfulness	54 (N=28)	75 (N=112)	1100
Sense of Coherence Total	65 (N=28)	73(N=114)	1417
Neuroticism	58 (N=28)	74(N=112)	1219
Extraversion	77 (N=28)	69(N=112)	1381
Age	69 (N=28)	70(N=111)	1516
General Health Questionnaire	73 (N=28)	71(N=114)	1565

Table 14: Sense of Coherence Scores > 130

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	76(N=39)	84 (N=124)	2196
Commitment	88 (N=39)	80 (N=124)	2169
Control	91 (N=39)	79 (N=124)	2053
Hardiness Total	84 (N=39)	81 (N=124)	2345
Comprehensiblty	86 (N=39)	81 (N=125)	2284
Manageability	77 (N=39)	84 (N=125)	2242
Meaningfulness	73 (N=39)	85 (N=125)	2060
Sense of Coherence Total	76 (N=39)	84 (N=125)	2182
Neuroticism	72 (N= 39)	84 (N= 122)	2037
Extraversion	67(N=39)	85 (N=122)	1856
Age	91 (N=36)	78 (N=125)	1873
General Health Questionnaire	92 (N=39)	79 (N=125)	2056

Table 15: Control Scores < 31

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	64 (N=28)	71(N=110)	1400
Commitment	71 (N=28)	69(N=110)	1489
Control	68 (N=28)	70(N=110)	1491
Hardiness Total	69 (N=28)	70(N=110)	1516
Comprehensiblty	70 (N=28)	73(N=116)	1548
Manageability	68 (N=28)	73(N=116)	1498
Meaningfulness	53 (N=28)	77 (N=116)	1081
Sense of Coherence Total	64 (N=28)	74(N=116)	1383
Neuroticism	63 (N=28)	73(N=114)	1360
Extraversion	76 (N=28)	70(N=114)	1459
Age	57 (N=28)	74(N=113)	1202
General Health Questionnaire	78 (N=28)	717(N=116)	1466

Table 16: Control Scores > 31

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	81 (N=39)	82 (N=123)	2364
Commitment	85 (N=39)	80 (N=123)	2275
Control	89 (N=39)	79 (N=123)	2109
Hardiness Total	84 (N=39)	81 (N=123)	2305
Comprehensiblty	87 (N=39)	80 (N=123)	2195
Manageability	84 (N=39)	81 (N=123)	2314
Meaningfulness	76 (N=39)	83 (N=122)	2178
Sense of Coherence Total	84 (N=39)	81 (N=123)	2313
Neuroticism	67 (N=39)	84 (N=120)	1842
Extraversion	NA	NA	NA
Age	100 (N=36)	74 (N=123)	1481
General Health Questionnaire	87 (N=39)	80 (N=123)	2171

Table 17: Challenge Scores < 28

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	67 (N=29)	62(N=97)	1315
Commitment	66 (N=29)	63(N=97)	1328
Control	63 (N=29)	64(N=97)	1393
Hardiness Total	67 (N=29)	62(N=97)	1304
Comprehensiblty	71 (N=29)	61(N=97)	1188
Manageability	63 (N=29)	63(N=97)	1394
Meaningfulness	NA	NA	NA
Sense of Coherence Total	63 (N=29)	63(N=97)	1393
Neuroticism	NA	NA	NA
Extraversion	56 (N=29)	65(N=96)	1201
Age	NA	NA	NA
General Health Questionnaire	64 (N=29)	63(N=97)	1397

Table 18 Challenge Scores >28

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	81 (N=38)	89 (N=136)	2357
Commitment	93 (N=38)	86 (N=136)	2372
Control	98 (N=38)	85 (N=136)	2190
Hardiness Total	91 (N=38)	86 (N=136)	2451
Comprehensiblty	85 (N=38)	88 (N=136)	2496
Manageability	39(N=38)	87 (N=136)	2487
Meaningfulness	83(N=38)	88 (N=135)	2404
Sense of Coherence Total	86 (N=38)	88 (N=136)	2539
Neuroticism	85 (N=38)	86 (N=133)	2489
Extraversion	84 (N=38)	86 (N=133)	2470
Age	81 (N=35)	87 (N=136)	2216
General Health Questionnaire	88 (N= 38)	87 (N=136)	2577

Table 19: Commitment Scores < 31

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	59 (N=26)	60(N=92)	1176
Commitment	67 (N=26)	57(N=92)	999
Control	66 (N=26)	57(N=92)	1025
Hardiness Total	64 (N=26)	58(N=92)	1088
Comprehensiblty	68 (N=26)	57(N=92)	985
Manageability	63 (N=26)	58(N=92)	1094
Meaningfulness	NA	NA	NA
Sense of Coherence Total	60 (N=26)	59(N=92)	1166
Neuroticism	NA	NA	NA
Extraversion	53 (N=26)	91(N=61)	1025
Age	67 (N=26)	55(N=89)	929
General Health Questionnaire	61 (N=26)	59(N=92)	1147

Table 20 Commitment Scores >31

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	88 (N=41)	92 (N=141)	2736
Commitment	99 (N=41)	89 (N=141)	2574
Control	100 (N=41)	89 (N=141)	2520
Hardiness Total	94 (N=41)	91 (N=141)	2799
Comprehensiblty	91(N=41)	91 (N=141)	2881
Manageability	91 (N=41)	91 (N=141)	2888
Meaningfulness	87 (N=41)	92 (N=140)	2690
Sense of Coherence Total	91 (N=41)	91 (N=141)	2879
Neuroticism	90 (N=41)	89 (N=138)	2816
Extraversion	85 (N=41)	91 (N=138)	2644
Age	93 (N=38)	89 (N=141)	2576
General Health Questionnaire	97 (N=41)	90 (N=141)	2650

Table 21: Dispositional Resilience Scale

Scores (Hardiness) < 90

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	70 (N=30)	67(N=104)	1487
Commitment	72 (N=30)	66(N=104)	1434
Control	72 (N=30)	66(N=104)	1426
Hardiness Total	75 (N=30)	65(N=104)	1324
Comprehensiblty	65 (N=30)	68(N=104)	1483
Manageability	64 (N=30)	68(N=104)	1451
Meaningfulness	NA	NA	NA
Sense of Coherence Total	60 (N=30)	70(N=104)	1338
Neuroticism	NA	NA	NA
Extraversion	67 (N=30)	67(N=103)	1544
Age	63 (N=30)	67(N=101)	1431
General Health Questionnaire	74 (N=30)	66(N=104)	1371

Table 22: Dispositional Resilience Scale

Scores (Hardiness) > 90

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	77 (N=37)	85 (N=129)	2152
Commitment	91 (N=37)	81 (N=129)	2115
Control	NA	NA	NA
Hardiness Total	86 (N=37)	83 (N=129)	2286
Comprehensiblty	93 (N=37)	80 (N=129)	2028
Manageability	91 (N=37)	81 (N=129)	2094
Meaningfulness	81 (N=37)	83 (N=128	2294
Sense of Coherence Total	92 (N=37)	81 (N=129)	2066
Neuroticism	78 (N=37)	83 (N=126)	2174
Extraversion	71 (N=37)	85 (N=126)	1933
Age	NA	NA	NA
General Health Questionnaire	83 (N=37)	83 (N=129)	2386

Table 23 :Sex Differences In Scores On Extroversion, Neuroticism And The Dimensions Of Sense Of Coherence And Hardiness Using Mann-Whitney U (2-tailed)

Areas Being Examined For Sex Differences	Mean Rank Men	Mean Rank Women	Mann-Whitney U
Challenge	146	151	7540
Commitment	158	148	7240
Control	160	147	7142
Hardiness Total	155	149	7480
Comprehensiblty	160	151	7550
Manageability	156	152	7790
Meaningfulness	132	158	6613*
Sense of Coherence Total	154	153	7926
Neuroticism	132	156	6618*
Extroversion	143	153	7326
General Health Questionnaire	162	150	7391

Note * = $p<.05$. These results are considered non significant after a Bonferroni Correction is applied.

Table 24: Sex Differences in Scores on the Battery Among Those With High or Low Scores on Health and Personality Questionnaires as Divided at the Median

Variable With Sex Differences	Group With Higher Score	Median of Variable	25th and 75th Percentile (Men)	25th and 75th Percentile (Women)	Number of Subjects	Mann-Whitney U	Areas Divided Into High and Low
Age	M	M=36.5 F=35	30 47	29 45	M=33 F=104	1387**	High Hardiness > 90
Control	M	M=32 F=31	28 35	28 34	M=33 F=104	1585*	High Hardiness > 90
Meaningfulnes	F	M=35 F=35	30 38	33 39	M=34 F=135	1058*	Low Hardiness < 90
Neuroticism	F	M=10 F=12.5	8 15	8 16	M=34 F=135	1065*	Low Hardiness < 90
Meaningfulnes	F	M=35 F=35	30 38	33 39	M=26 F=92	793**	Low Commit < 31
Neuroticism	F	M=10 F=12.5	8 15	8 16	M=26 F=92	684*	Low Commit < 31
Neuroticism	F	M=10 F=12.5	8 15	8 16	M=45 F=157	2661*	Low Challenge < 28
Age	M	M=36.5 F=35	30 47	29 45	M=45 F=157	2809*	Low Challenge < 28
Meaningfulnes	F	M=32 F=35	30 38	33 39	M=45 F=157	988**	Low Challenge < 28
Age	M	M=43 F=37	30 47	29 45	M=36 F=123	1481*	High Control > 31
Extroversion	F	M=11 F=12	9 14	9 16	M=36 F=123	1834*	High Control > 31
Neuroticism	F	M=9 F=10	8 15	8 16	M=36 F=123	1842*	High Control > 31
Age	F	M=31 F=34	30 47	29 45	M=28 F=113	1202*	Low Control <31
Extroversion	F	M=11 F=12	9 14	9 16	M=39 F=128	1734**	High Compreh > 46
Meaningfulnes	F	M=32 F=35	30 38	33 39	M=28 F=111	1076**	Low Compreh < 46
Neuroticism	F	M=10 F=12.5	8 15	8 16	M=28 F=111	1066**	Low Compreh < 46
Control	M	M=32 F=31	28 35	28 34	M=37 F=133	1830*	High Manage > 48
Extroversion	M	M=11 F=12	9 14	9 16	M=37 F=133	1744**	High Manage > 48
Meaningfulnes	F	M=35 F=35	30 38	33 39	M=30 F=106	1092**	Low Manage < 48
Neuroticism	F	M=10 F=12.5	8 15	8 16	M=30 F=106	1141*	Low Manage < 48
Commitment	M	M=31 F=28	29 37	25 32	M=21 F=140	1715*	High Meaning > 35
Neuroticism	F	M=10 F=12.5	8 15	8 16	M=32 F=98	1152*	Low Meaning < 35
							Table Continues

Table 24: (Continued)

Sex Differences in Scores on the Battery Among Those With High or Low Scores on Health and Personality Questionnaires as Divided at the Median

Variable With Sex Differences	Group With Higher Score	Median of Variable		25th and 75th Percentile (Men)		25th and 75th Percentile (Women)		Number of Subjects		Mann-Whitney U	Areas Divided Into High and Low
Extroversion	F	M=11	F=12	9	14	9	16	M=39	F=122	1856*	High SOCQ > 130
Meaningfulnes	F	M=35	F=35	30	38	33	39	M=28	F=112	1100**	Low SOCQ < 130
Meaningfulnes	F	M=35	F=35	30	38	33	39	M=33	F=104	1340**	Low Neuro < 12
Extroversion	F	M=11	F=12	9	14	9	16	M=33	F=104	1244**	Low Neuro < 12
GHQ	M	M=2	F=2	1	5	0	5	M=33	F=104	1317**	Low Neuro < 12
Control	M	M=32	F=31	28	35	28	34	M=33	F=104	1250**	Low Extra < 12
Extroversion	M	M=11	F=12	9	14	9	16	M=33	F=104	1224**	Low Extra < 12
Age	M	M=36.5	F=35	30	47	29	45	M=33	F=104	1137*	Low Extra < 12
Manageability	M	M=49	F=48	43	56	42	56	M=33	F=104	1313*	Low Extra < 12

Note. Comprch = Comprehensibility; Extra = Extroversion; F = female; GHQ = General Health Questionnaire; M = male; Manage = Manageablity; Meaning = Meaningfulness; Neuro = Neuroticism.

*p < .05. **p < .01. ***p < .001.

Table 25: Kendall's Correlations (2-Tailed) Between Sense of Coherence and Dispositional Resilience Scale Total Scores and Dimensions, and General Health Questionnaire Among the Female Groups with Low Scores on Neuroticism (Tau)

	CH	CM	CO	HTOT	Comp	Man	Mean	SOC TOT	Extra	Neuro	Lie	Age
CM	.11											
CO	- .04											
HTOT	.22**											
Comp	- .04	.17*	.17*	.17*								
Man	.04		.17*	.2**								
Mean	0	.15	.01	.07	.07							
SOC TOT	.03	.25	.16*	.22**								
Extra	- .09	- .13	- .03	- .16*	- .02	.21**		.19**				
Neuro	- .08	- .09	.07	- .06	- .19**	- .13	.1	- .12	.13			
Lie	- .17	- .15	-.32**	- .28**	- .02	- .03	- .02	- .12	.13	.02		
Age		.05	.04	.22**	.12	.09	.09	.12	- .12	- .06	- .1	
GHQ	.07	.06	.03	.05		- .28	- .04		- .02		.16	- .01

Note : CM= Commitment; CO = Control; HTOT= Dispositional Resilience Scale total score; Comp= Comprehensibility; Man = manageability, Mean = Meaningfulness; SOCTOT = Sense of Coherence Questionnaire total score; Extra = Extroversion; Neuro = Neuroticism; GHQ = General Health Questionnaire.102 women made up the sample for all but those involving the Lie scale where scores for only 39 women were available.
** = p<.01, * = p<.05. These results are considered non significant after a Bonferroni Correction is applied.

Table 26: Kendall's Correlations (2-Tailed) Between Sense of Coherence and Dispositional Resilience Scale Total Scores and Dimensions, and General Health Questionnaire Among the Female Groups with Low Scores on Extroversion

	CH	CM	CO	HTOT	Comp	Man	Mean	SOC TOT	Extra	Neuro	Lie	Age
CM												
CO												
HTOT												
Comp	.28**											
Man												
Mean	.12	.2**	.05	.16*	.15*	.18**						
SOC TOT												
Extra	.12	.07	.17*	.18*	.19**	.21**	.08	.19**				
Neuro	- .36						- .08		- .19**			
Lie	- .13	- .44**	-.34*	- .38*	- .07	- .06	- .17	- .05	- .14	- .05		
Age	.03	.14	.11	.11	.06	.04	.19**	.1	- .12	- .04	.15	
GHQ	- .12					- .34	- .11		- .04		.06	- .01

Note : CM= Commitment; CO = Control; HTOT= Dispositional Resilience Scale total score; Comp= Comprehensibility; Man = manageability, Mean = Meaningfulness; SOCTOT = Sense of Coherence Questionnaire total score; Extra = Extroversion; Neuro = Neuroticism; GHQ = General Health Questionnaire. Between 92 and 95 women were used in all statistics except those involving the Lie scale when 22 or 23 women were used.

** = $p<.01$, * = $p<.05$. These results are considered non significant after a Bonferroni Correction is applied.

Table 27: Kendall's Correlations (2-Tailed) Between Sense of Coherence and Dispositional Resilience Scale Total Scores and Dimensions, and General Health Questionnaire Among the Male Groups with Low Scores on Neuroticism

	CH	CM	CO	HTOT	Comp	Man	Mean	SOC TOT	Extra	Neuro	Lie
CM	..24*										
CO	.1										
HTOT	.36**										
Comp	- .05		.21	.34**							
Man	- .06		.36**		.28*						
Mean	.09	.28*	.31**	.32**	.24*	.31**					
SOC TOT	- .04		.33**								
Extra		.06	.06	.19	.02	- .06	.2	0			
Neuro	.08	-.39**	-.33**	-.36**		-.28*	- .23		.11		
Lie	- .15	- .38	.02	- .15	- .29	- .23	- .1	- .21	- .13	.32	
Age	- .17	.04	.01	.04	.21	.25*	.07	.31**	- .34**	- .22	- .05
GHQ	- .22	-.41**	-.2	-.39**	-.32**	- .03	- .29*	-.13	- .18	.29*	.58*

Note : CM= Commitment; CO = Control; HTOT= Dispositional Resilience Scale total score; Comp= Comprehensibility; Man = manageability, Mean = Meaningfulness; SOCTOT = Sense of Coherence Questionnaire total score; Extra = Extroversion; Neuro = Neuroticism; GHQ = General Health Questionnaire. 36 men made up the sample for all statistics above except those involing the Lie scale where scores for only 12 men were available.

** = p<.01, * = p<.05. These results are considered non significant after a Bonferroni Correction is applied.

Table 28: Kendall's Correlations (2-Tailed) Between Sense of Coherence and Dispositional Resilience Scale Total Scores and Dimensions, and General Health Questionnaire Among the Male Groups with Low Scores on Extroversion

	CH	CM	CO	HTOT	Comp	Man	Mean	SOC TOT	Extra	Neuro	Lie	Age
CM												
CO	.33**											
HTOT												
Comp	0	.37**										
Man	.14											
Mean	.32**		.37**		.27*	.36**						
SOC TOT	.13											
Extra		.34**	.28*	.32*	- .04	.05	.27*	.02				
Neuro	.09	-.27*	-.36**	-.35**			- .22		.07			
Lie	- .27	- .4	- .18	- .36	- .39	- .55*	- .57*	- .63*	- .32	.4		
Age	.07	.12	.06	.18	.3*	.25*	- .03	.3*	-.15	- .32**	- .39	
GHQ	- .18		-.39**		-39**	- .38**			- .13	.26*	.57*	.09

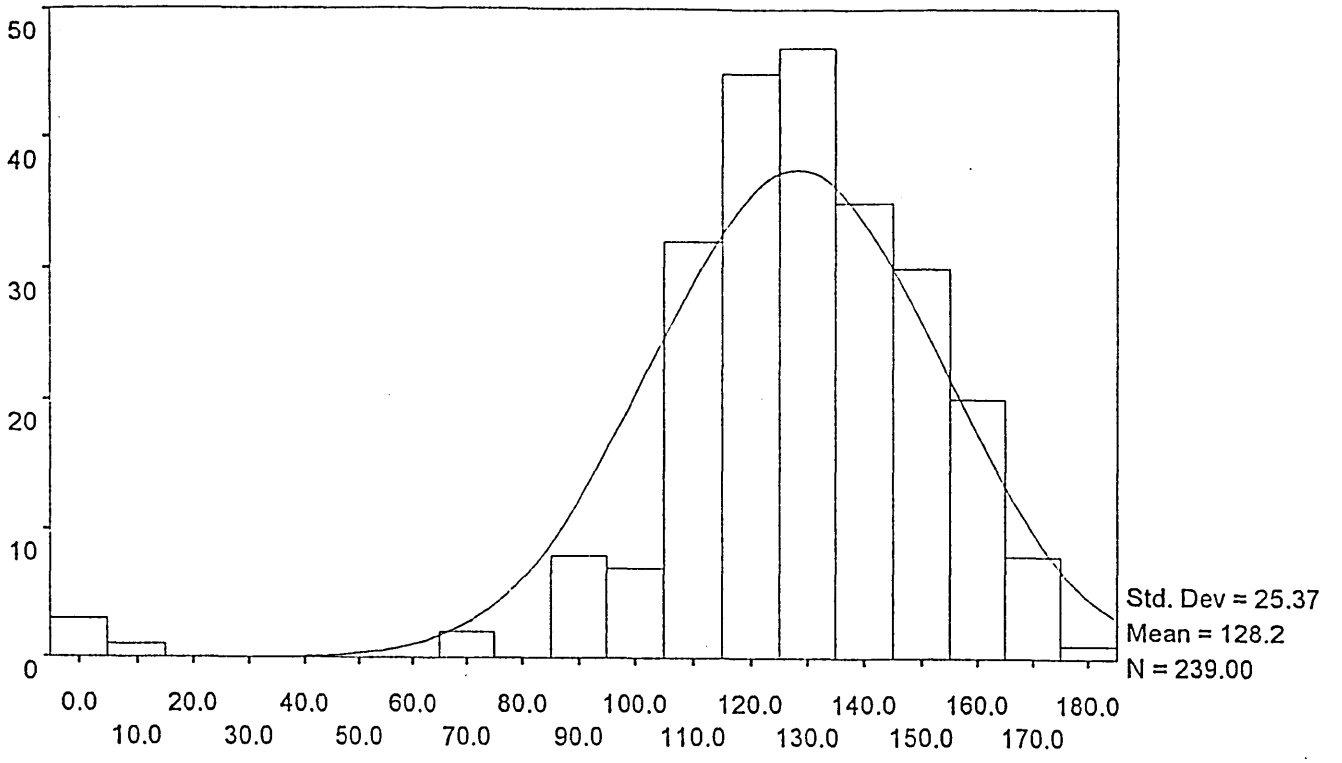
Note : CM= Commitment; CO = Control; HTOT= Dispositional Resilience Scale total score; Comp= Comprehensibility; Man = manageability, Mean = Meaningfulness; SOCTOT = Sense of Coherence Questionnaire total score; Extra = Extroversion; Neuro = Neuroticism; GHQ = General Health Questionnaire. 36 men made up the sample for all statistics above except those involing the Lie scale where scores for only 9 men were available.

** = $p<.01$, * = $p<.05$. These results are considered non significant after a Bonferroni Correction is applied.

APPENDIX IX: STUDY 3, EFFECT OF SEX DIFFERENCES ON INTERPRETATION OF SCORES ON THE SENSE OF COHERENCE QUESTIONNAIRE AND THE DISPOSITIONAL RESILIENCE SCALE.

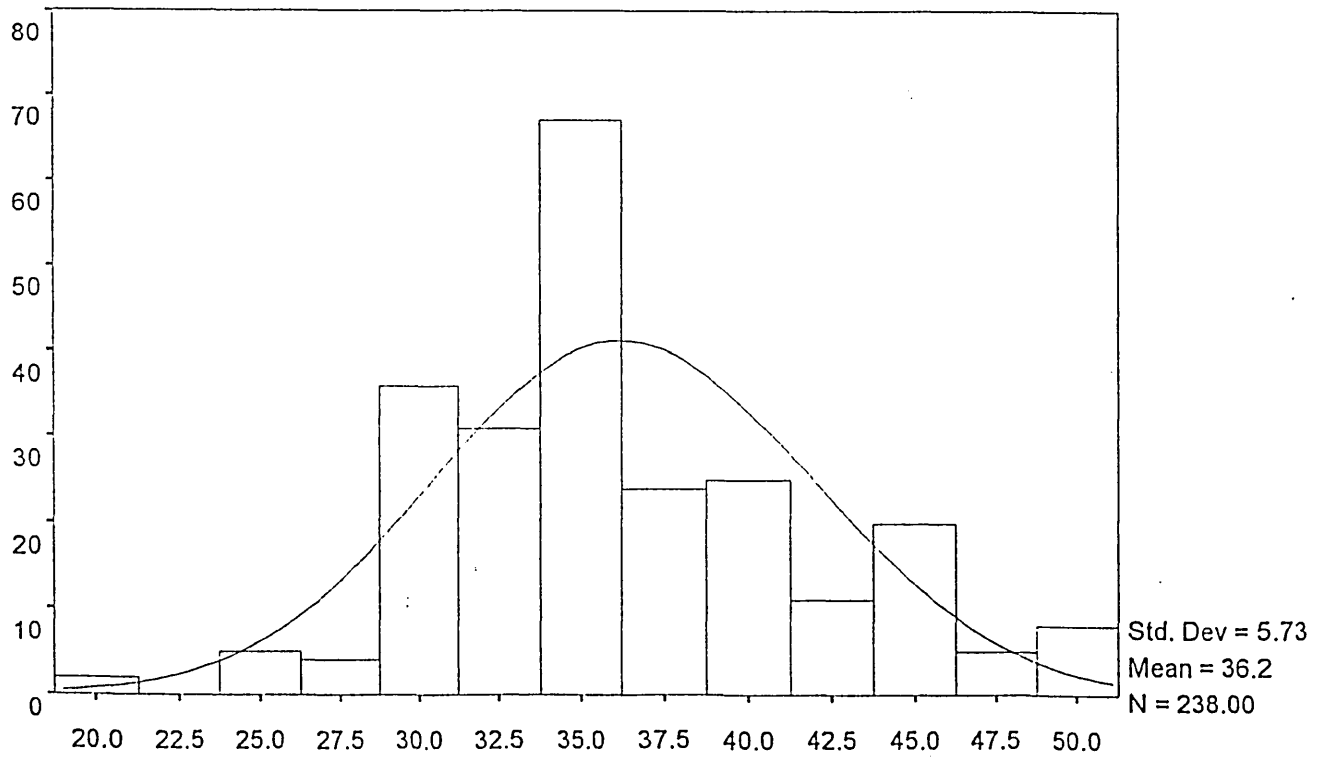
DISTRIBUTION OF SCORES FOR THE FEMALE OPEN UNIVERSITY GROUP USED IN STUDY 3.

Table 1: Distribution of Sense of Coherence Total Score



SOCTOT

Table 2: Distribution of Meaningfulness Scores



MEAN

Table 3: Distribution of Manageability Scores

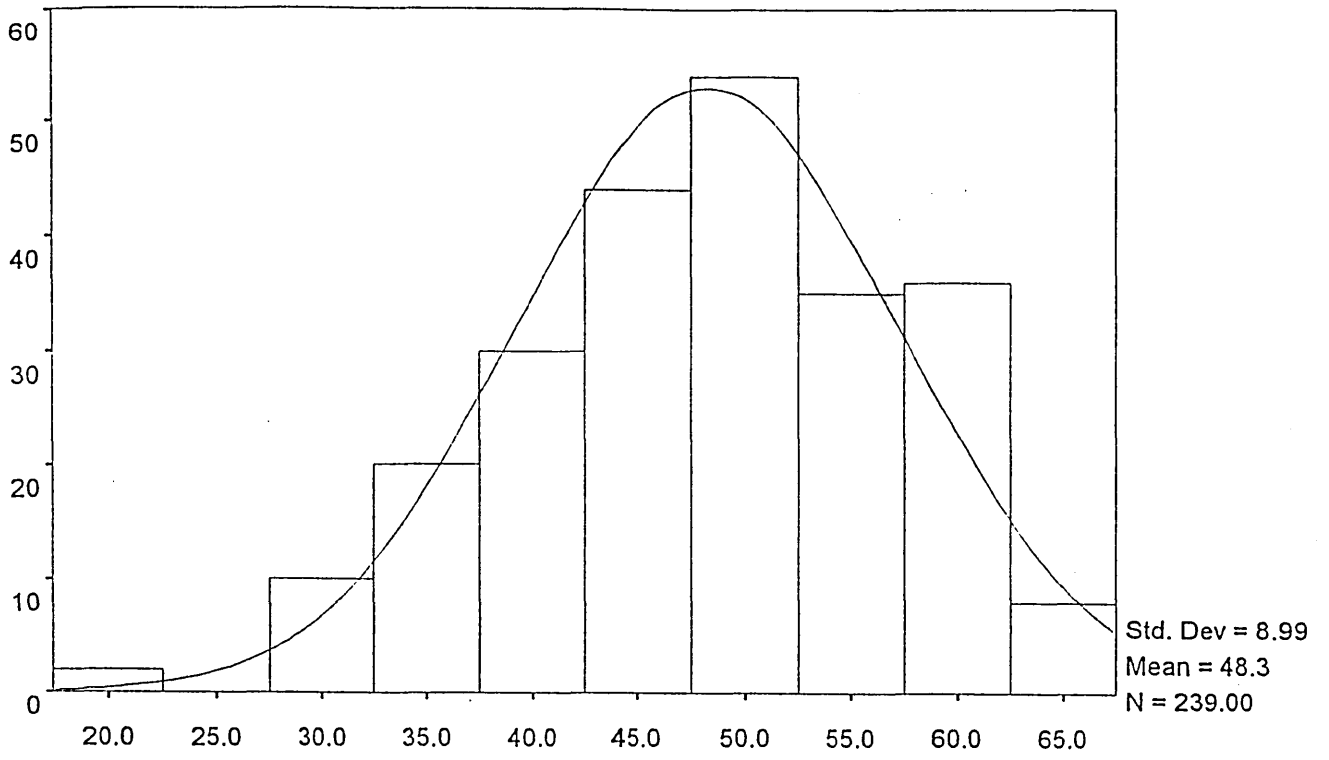


Table 4: Distribution of Comprehensibility Scores

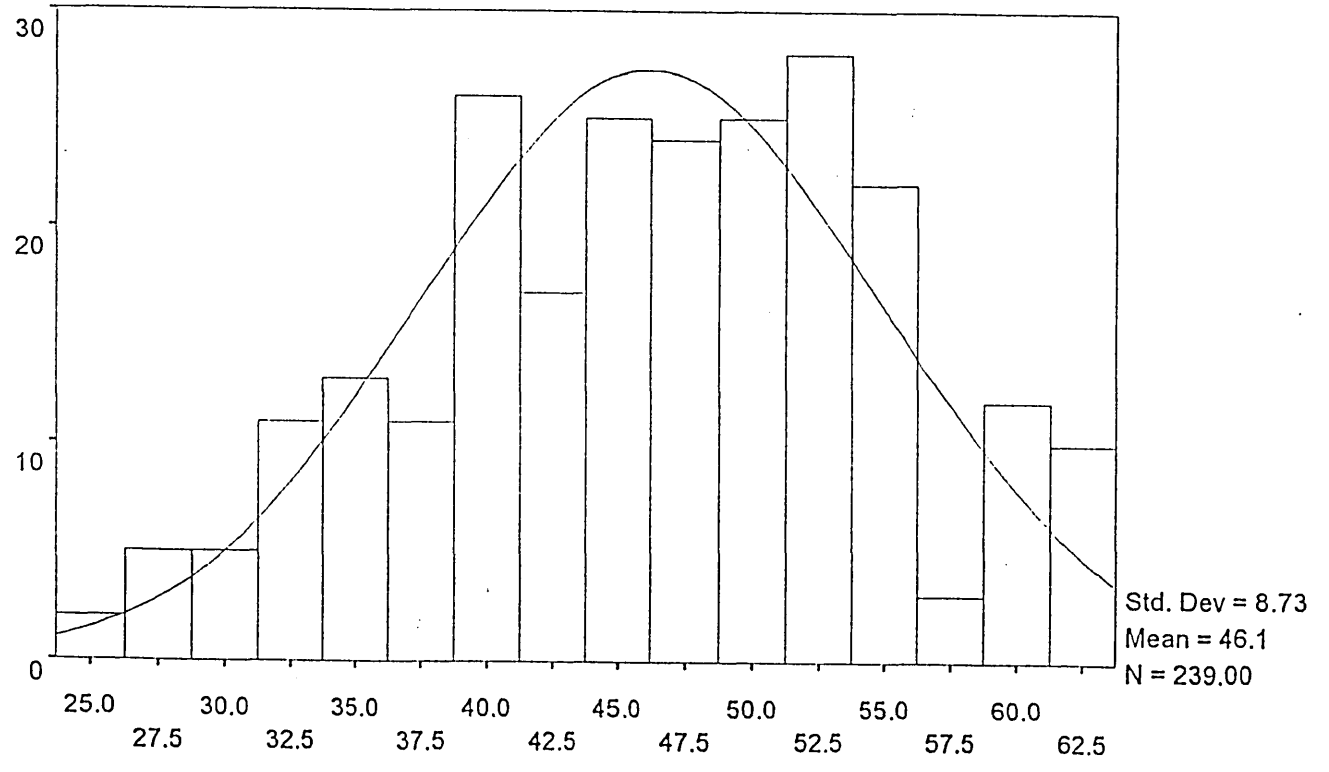


Table 5: Distribution of Hardiness Total Score (Dispositional Resilience Scale)

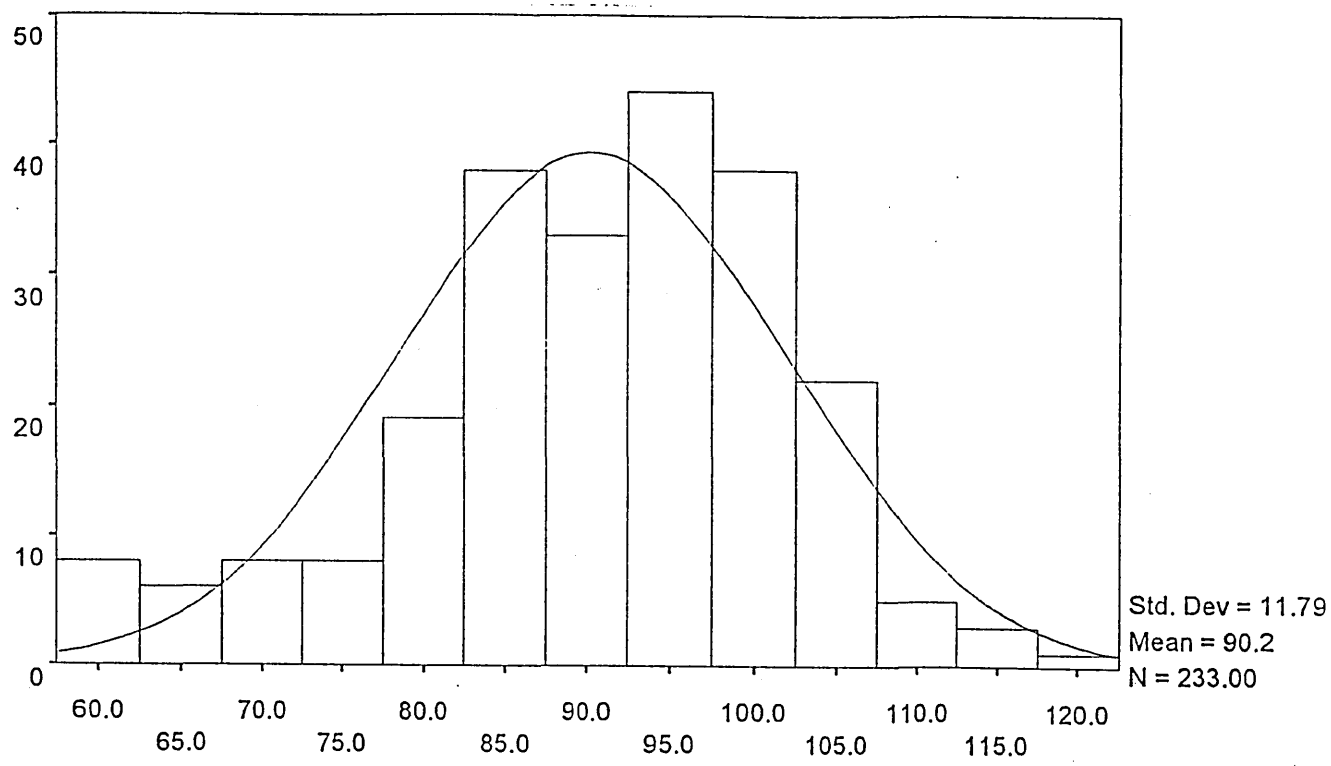


Table 6: Distribution of Control Scores

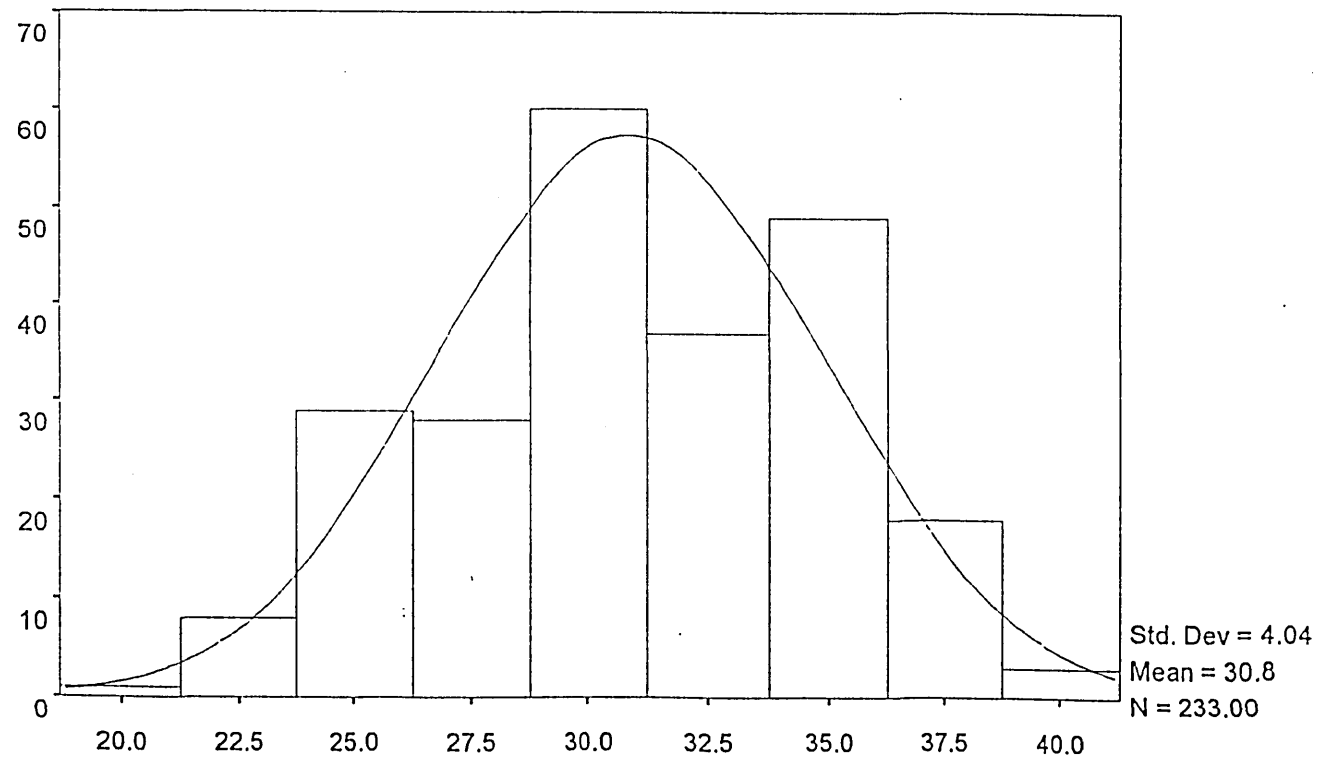


Table 7: Distribution of Commitment Scores

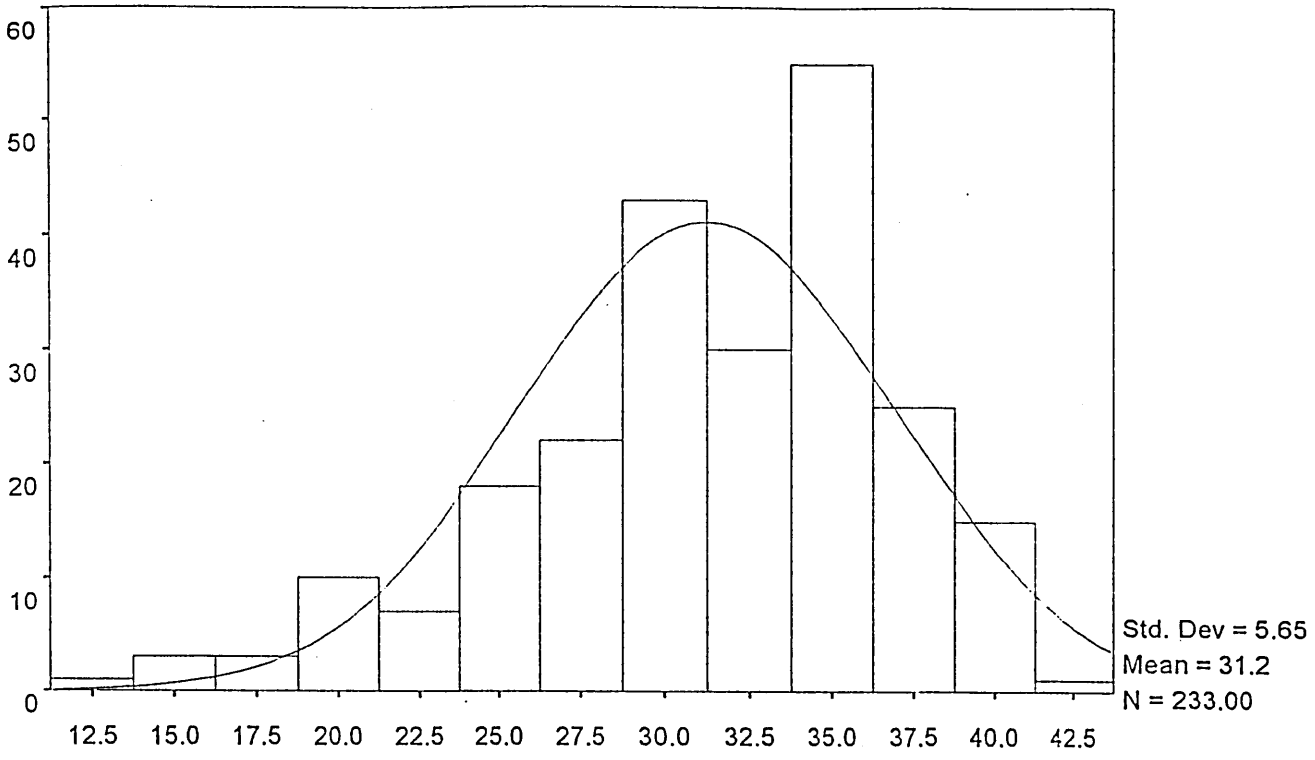


Table 8: Distribution of Challenge Scores

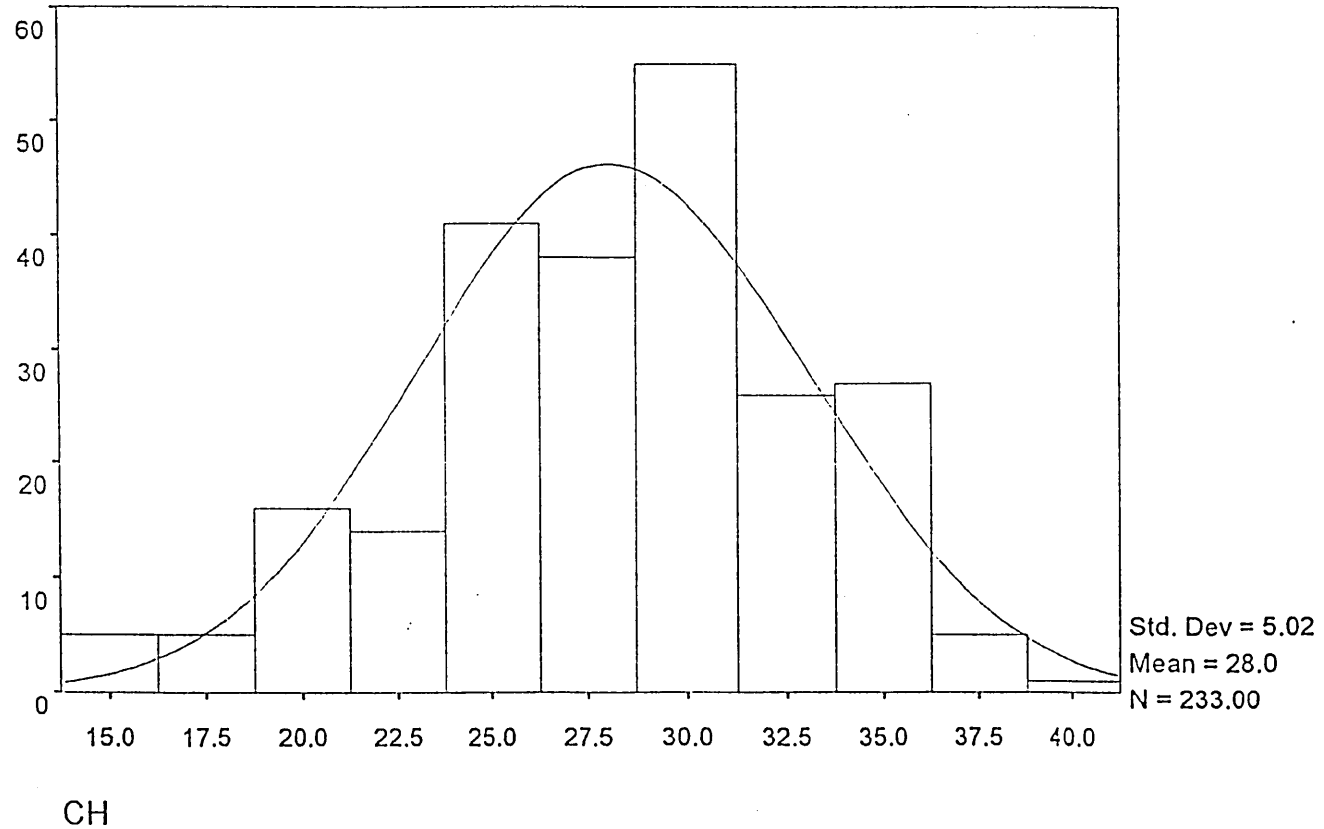
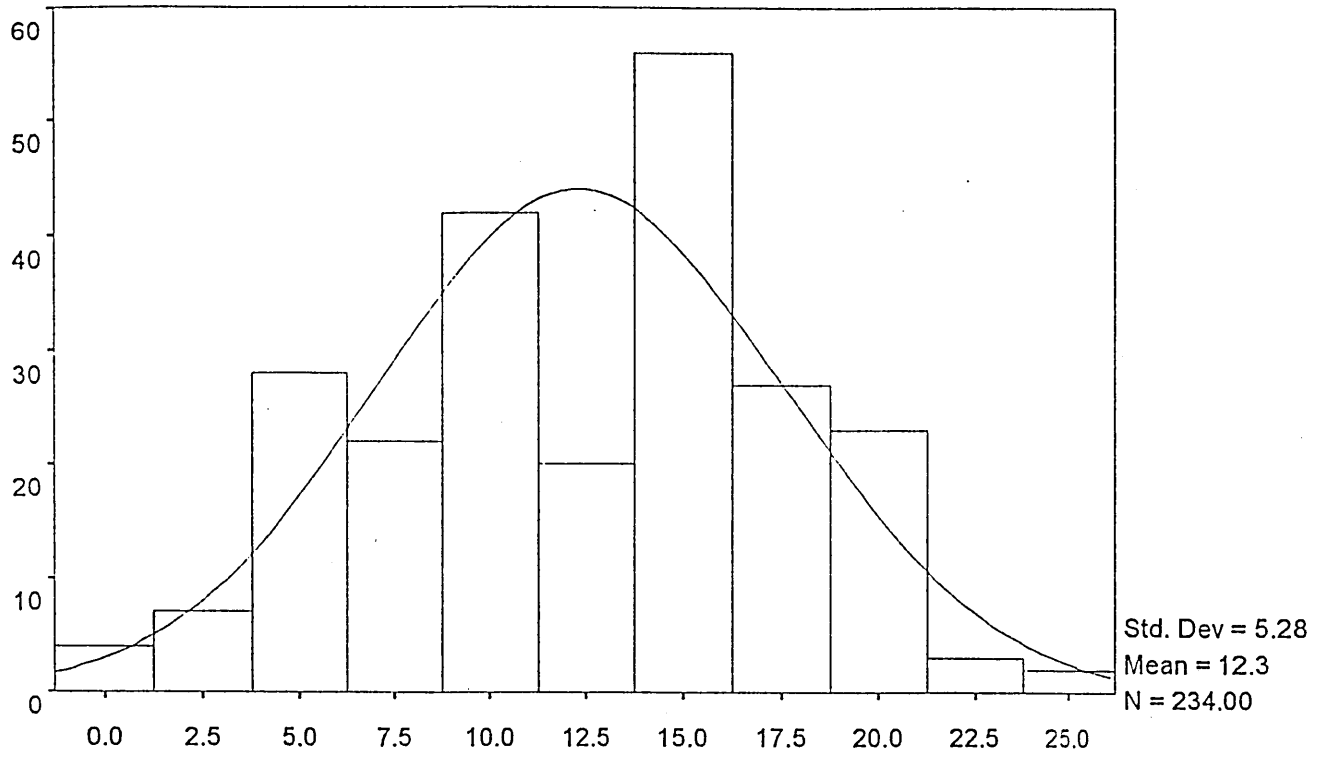
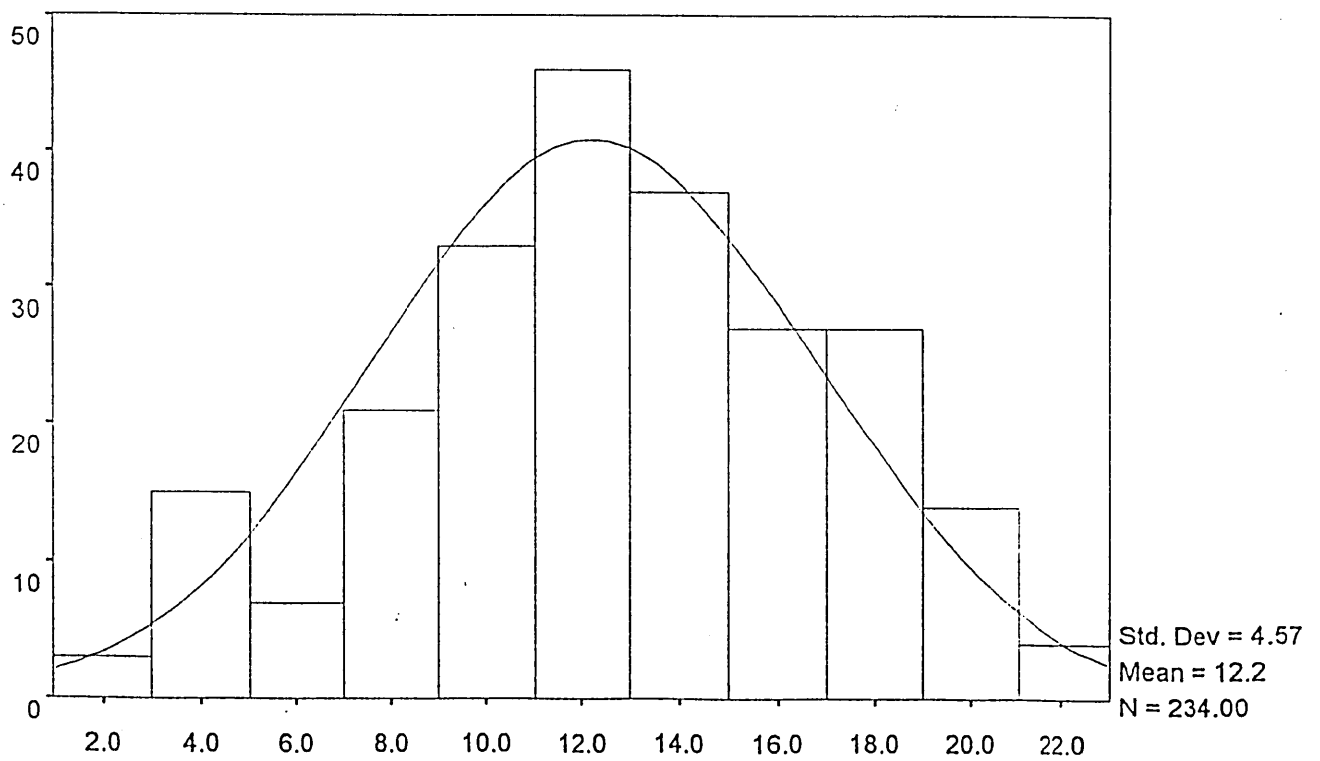


Table 9: Distribution of Neuroticism



NEURO

Table 10: Distribution of Extraversion



EXTRA

Table 11: Distribution of General Health Questionnaire Scores

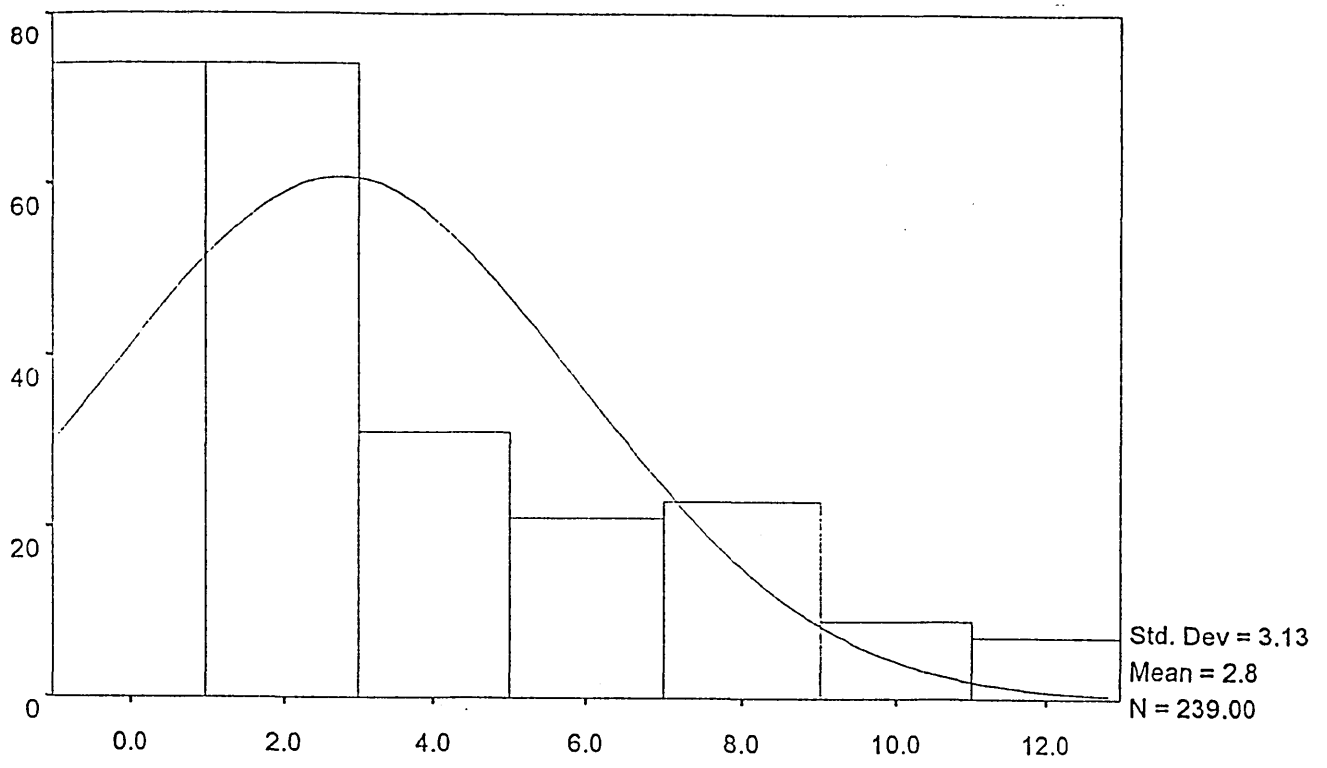
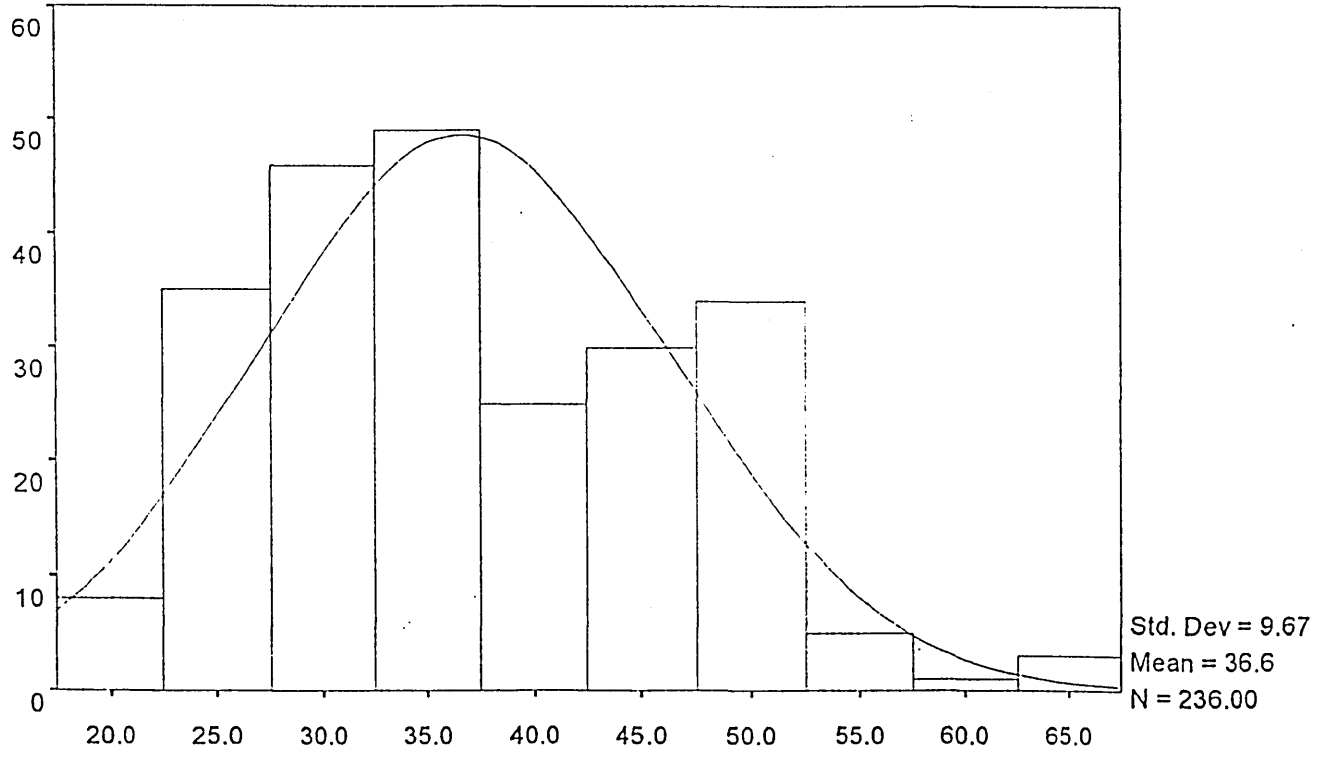


Table 12: Distribution of Age



APPENDIX X : STUDY 3, EFFECT OF SEX DIFFERENCES ON INTERPRETATION OF SCORES ON THE SENSE OF COHERENCE QUESTIONNAIRE AND THE DISPOSITIONAL RESILIENCE SCALE.

DISTRIBUTION OF SCORES FOR THE MALE OPEN UNIVERSITY GROUP USED IN STUDY 3.

Table 1: Distribution of Sense of Coherence Total Score

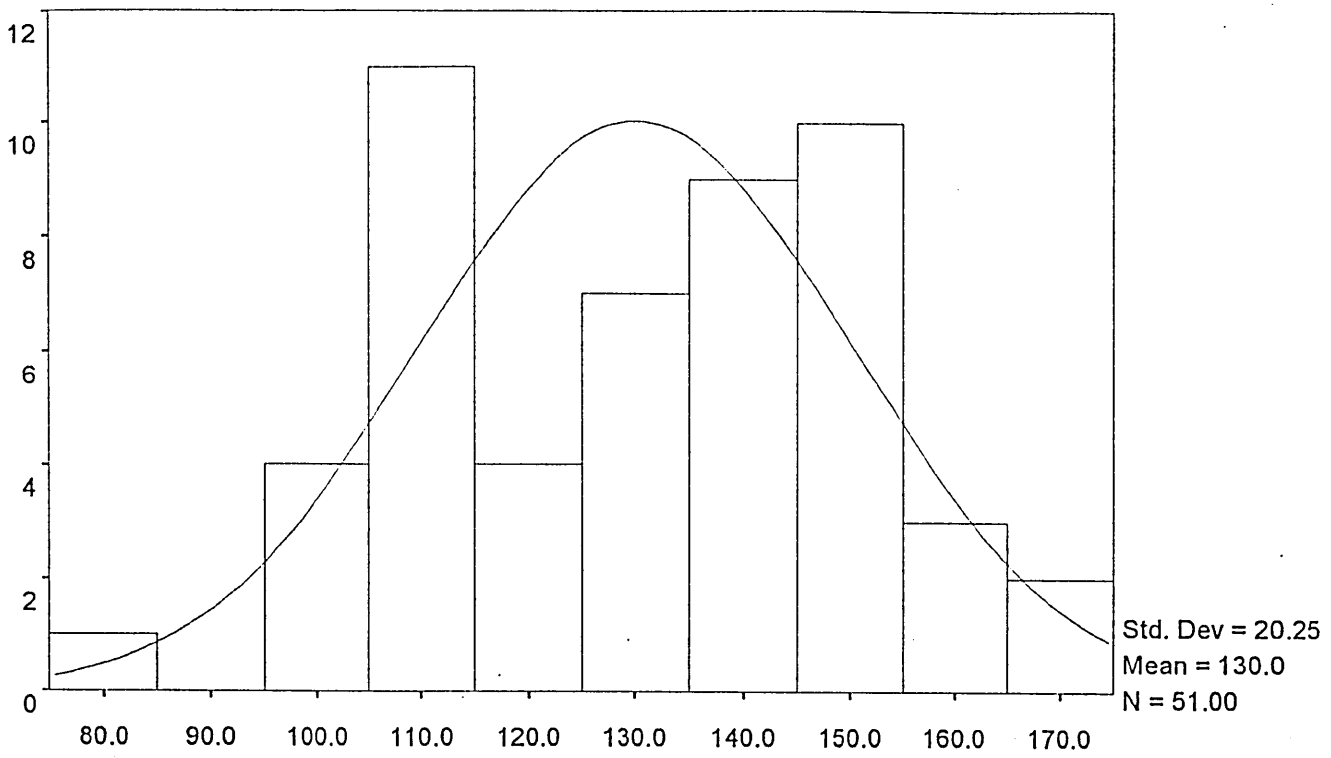


Table 2: Distribution of Comprehensibility Scores

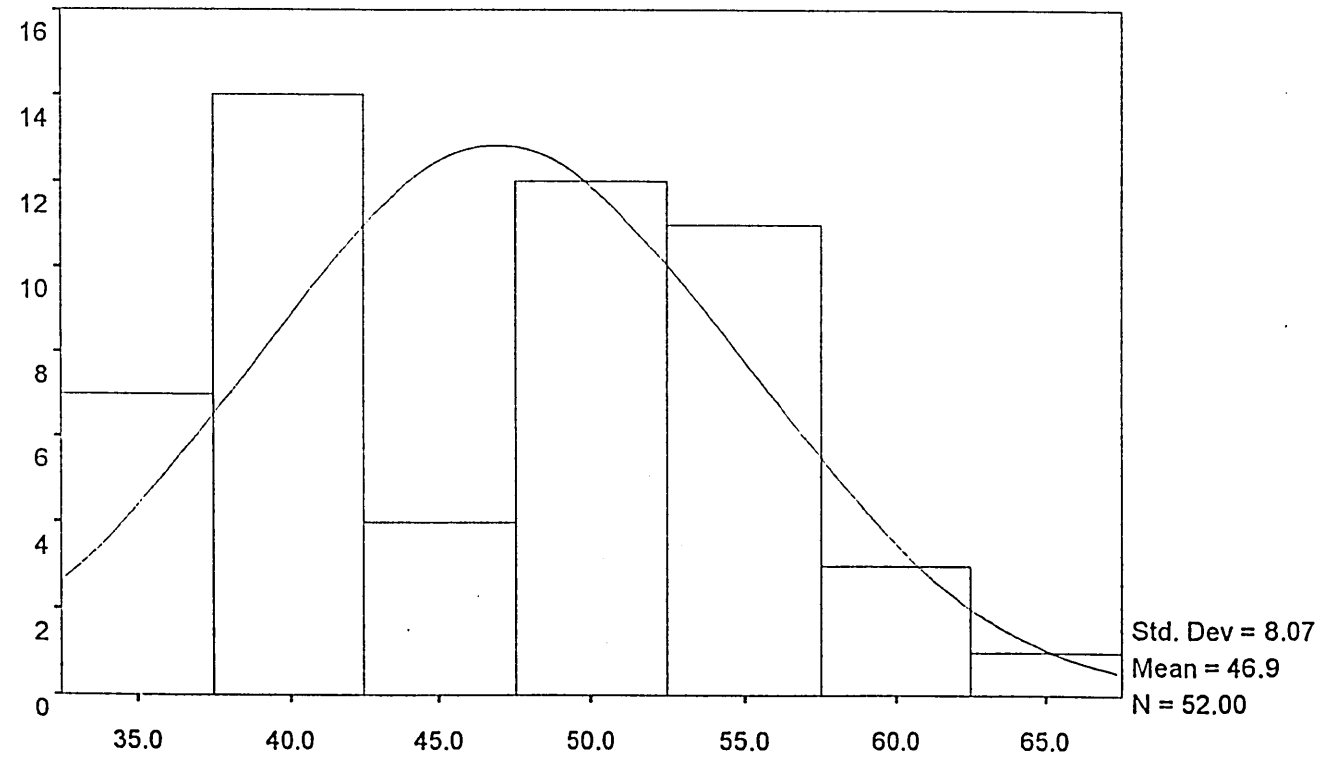


Table 3: Distribution of Manageability Scores

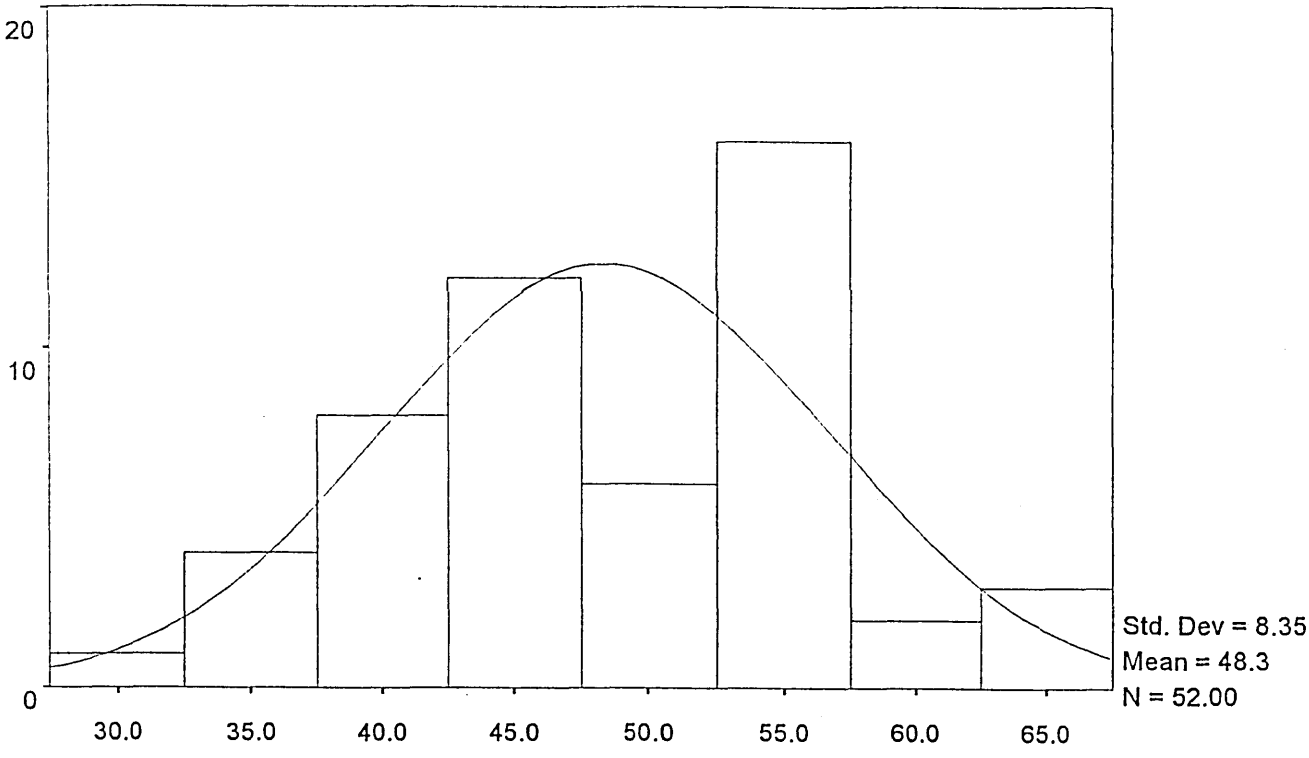


Table 4: Distribution of Meaningfulness Scores

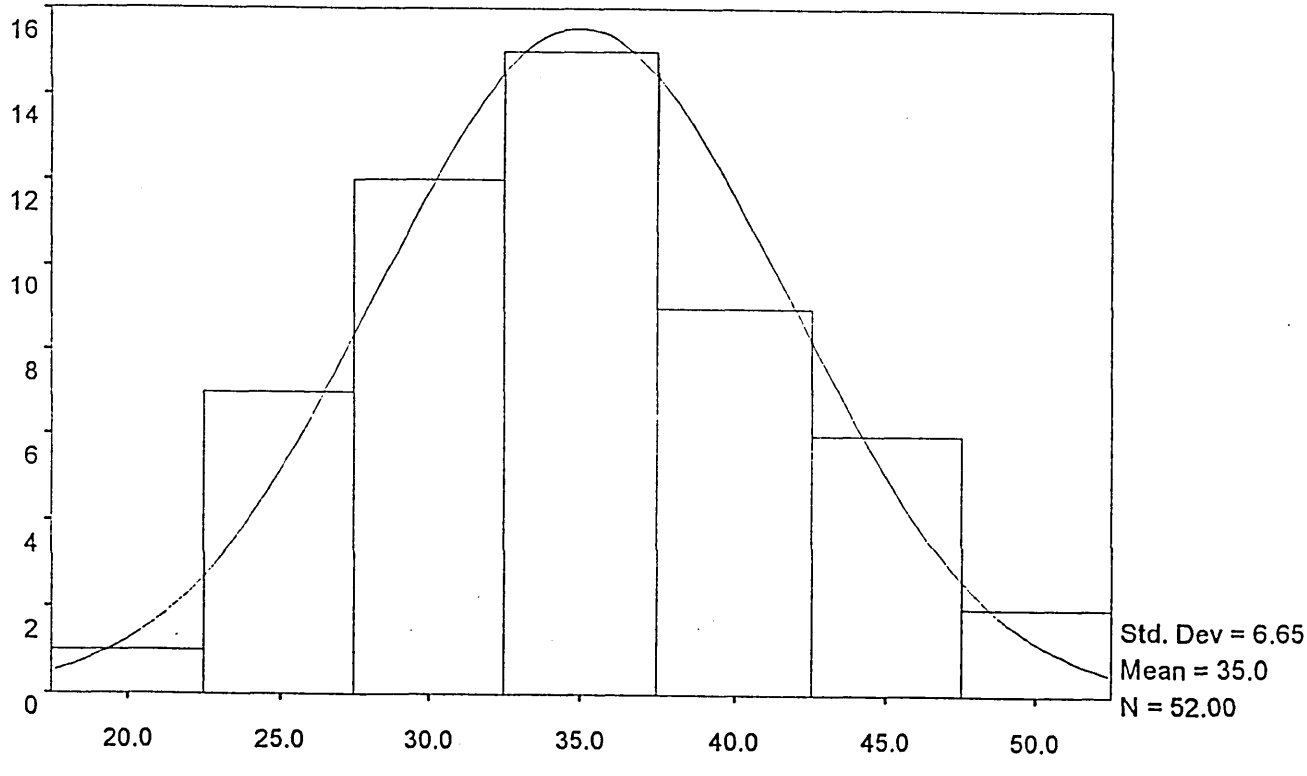


Table 5: Distribution of Hardiness Total Score (Dispositional Resilience Scale)

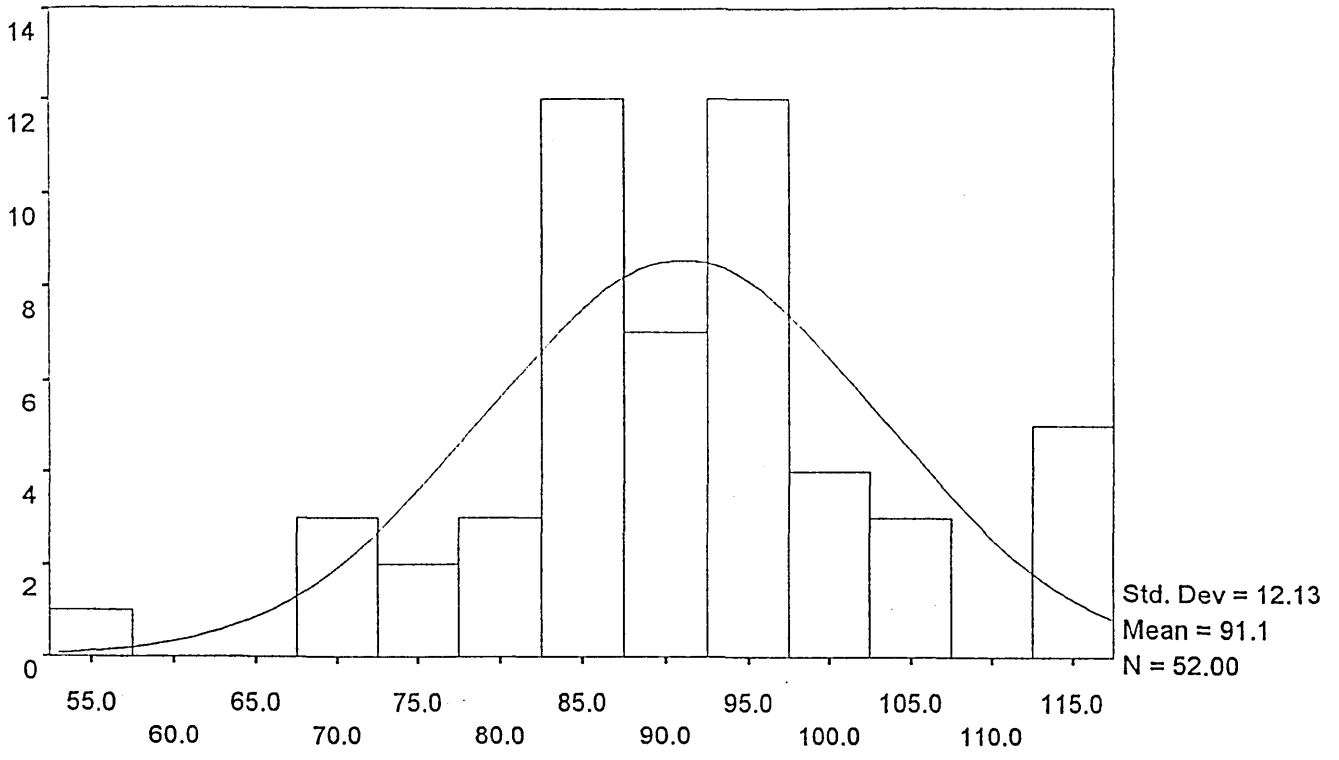


Table 6: Distribution of Challenge Scores

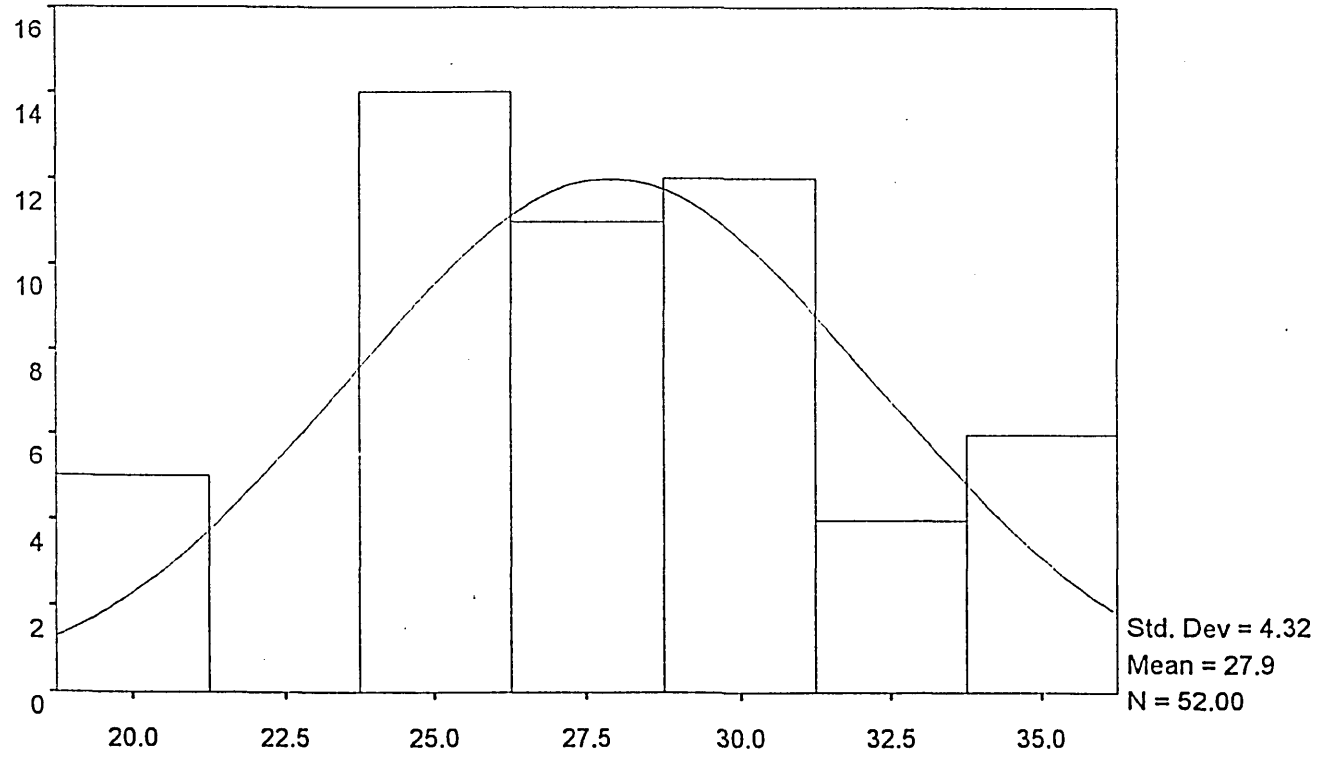
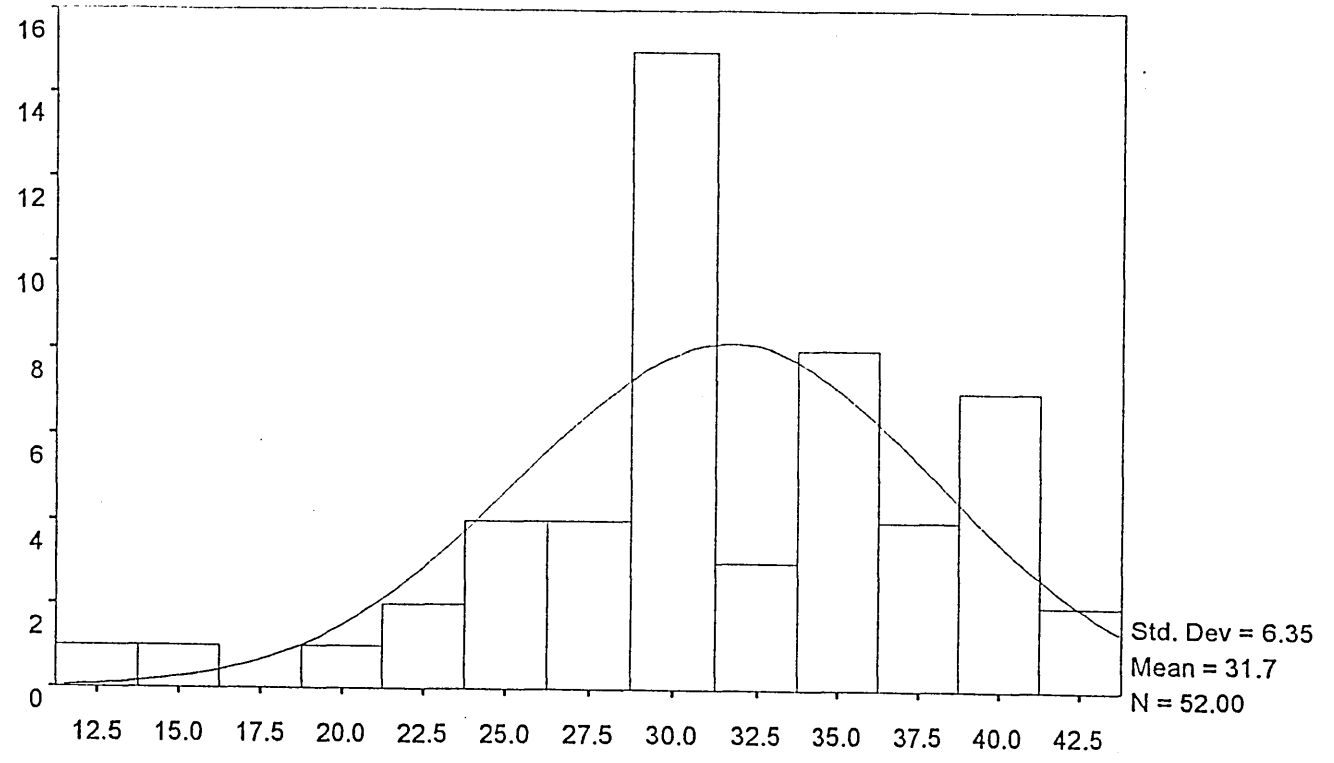
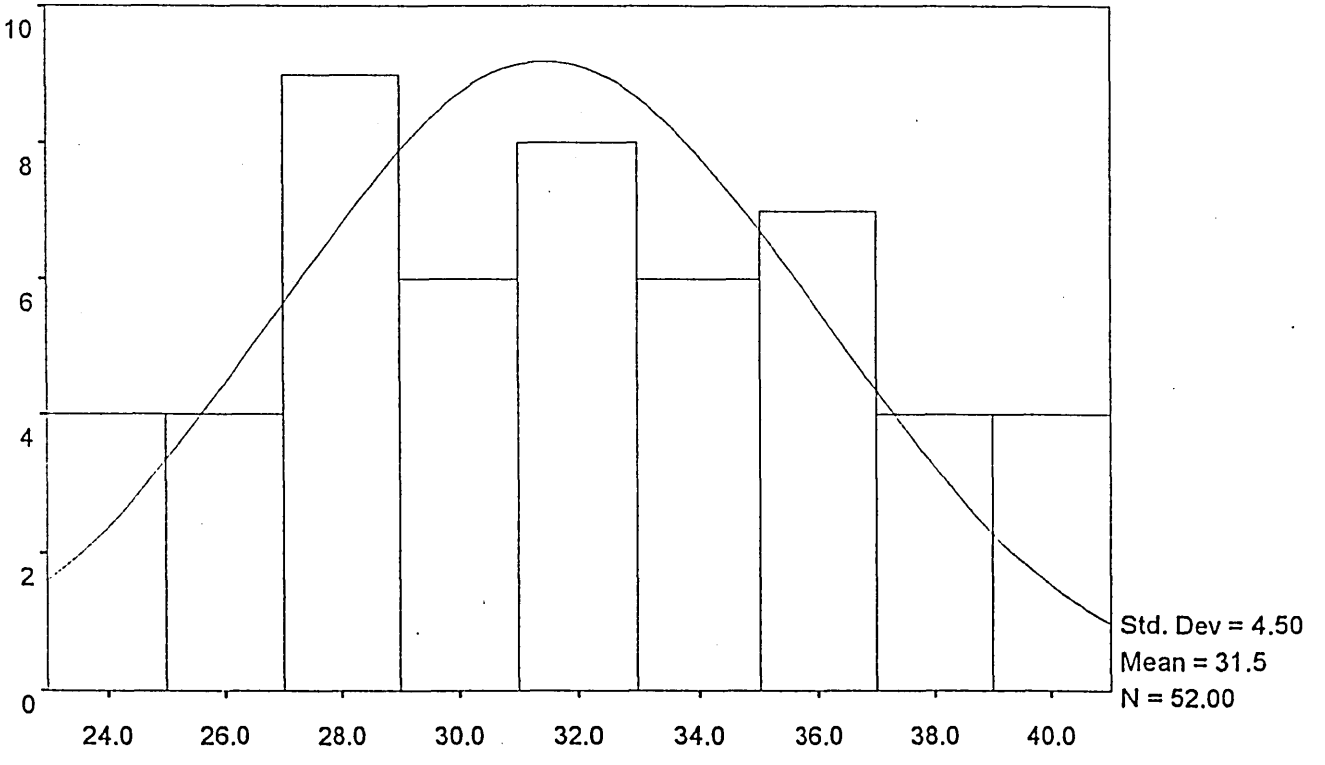


Table 7: Distribution of Commitment Scores



MCM

Table 8: Distribution of Control Scores



MCO

Table 9: Distribution of Extraversion

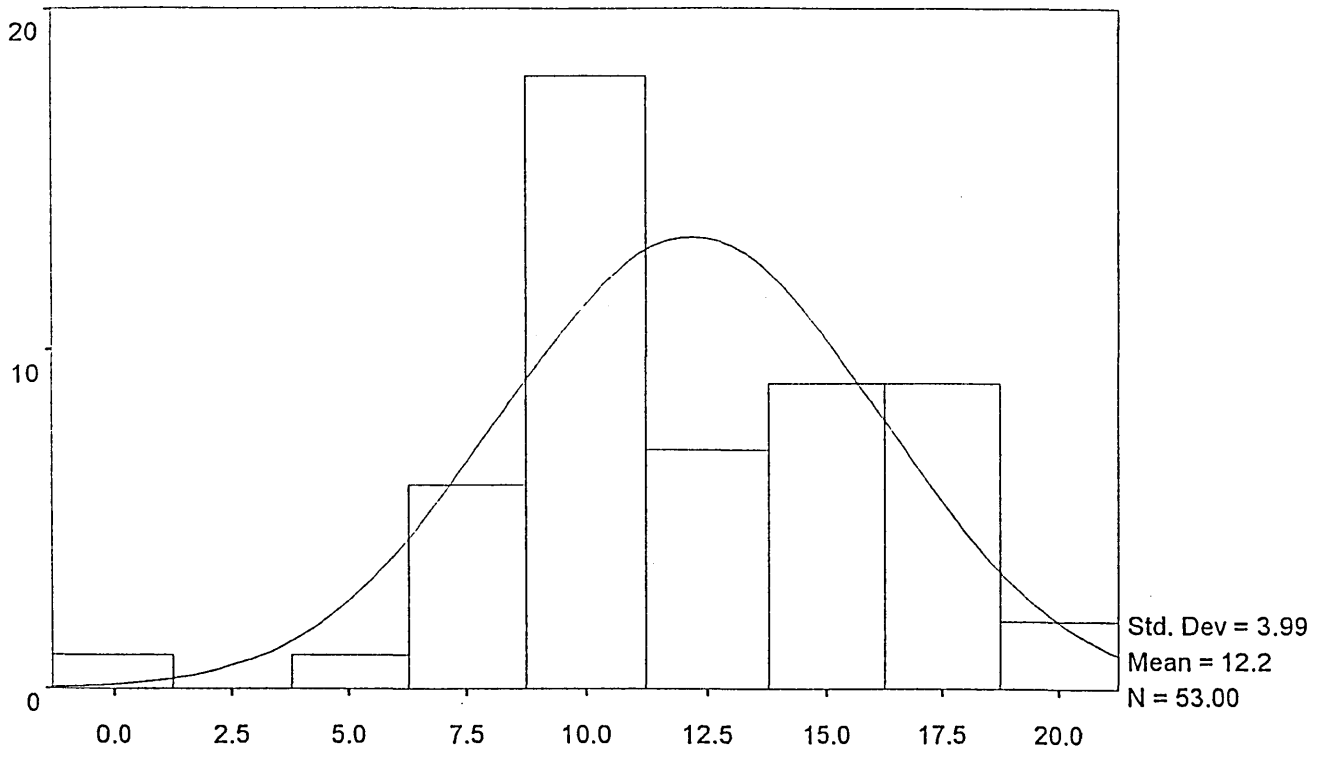


Table 10: Distribution of Neuroticism

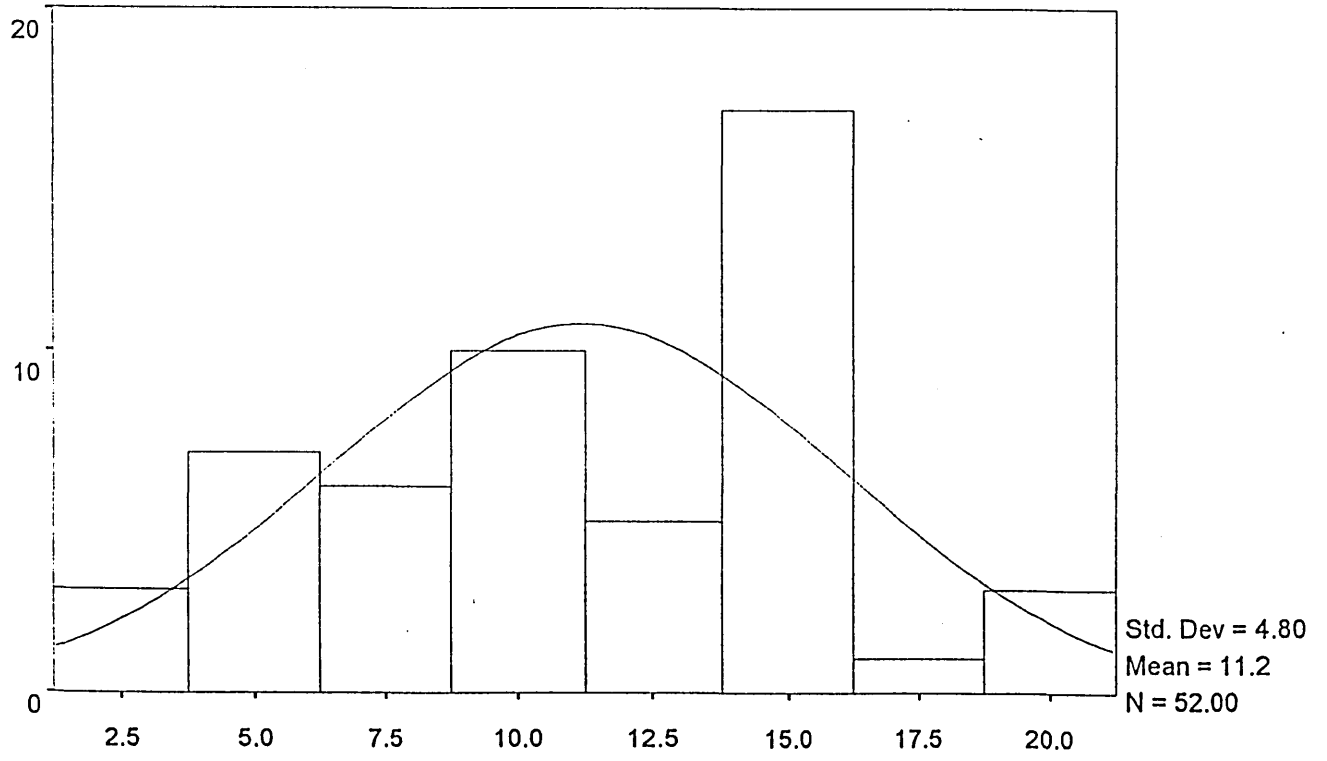


Table 11: Distribution of General Health Questionnaire Scores

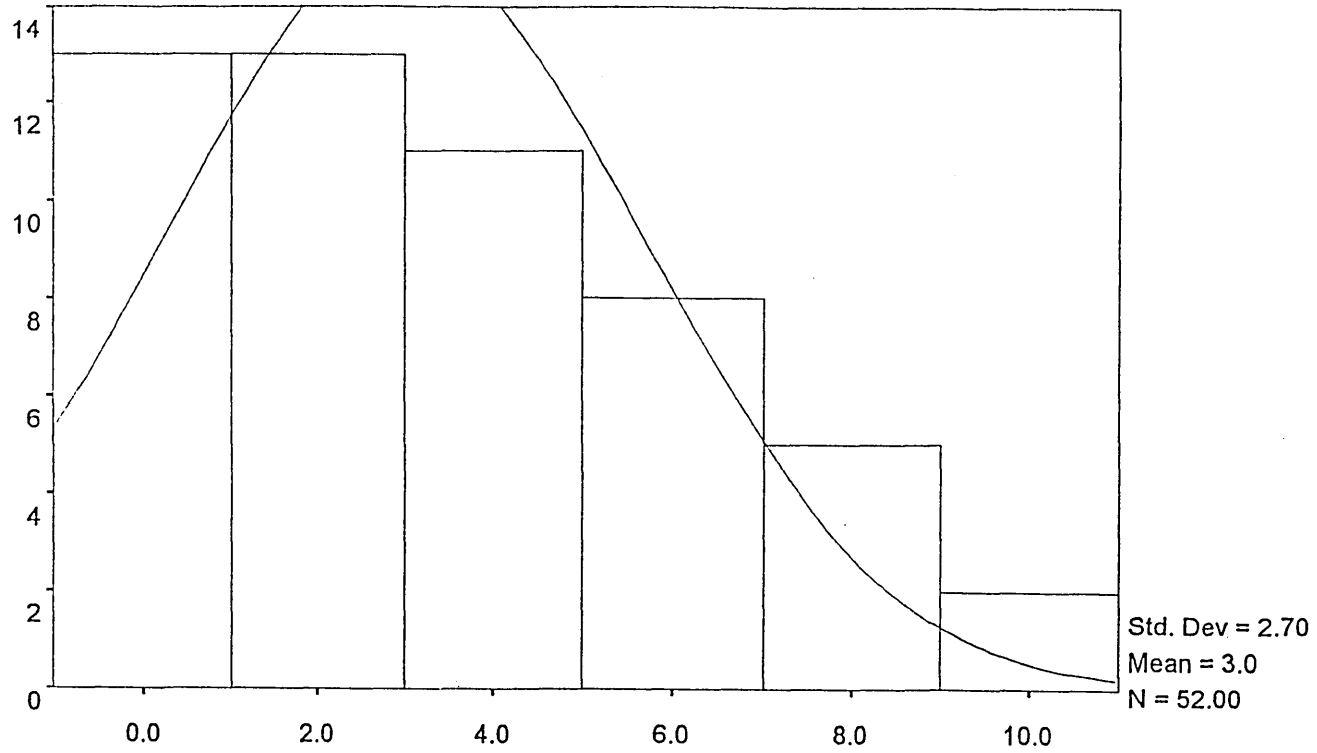
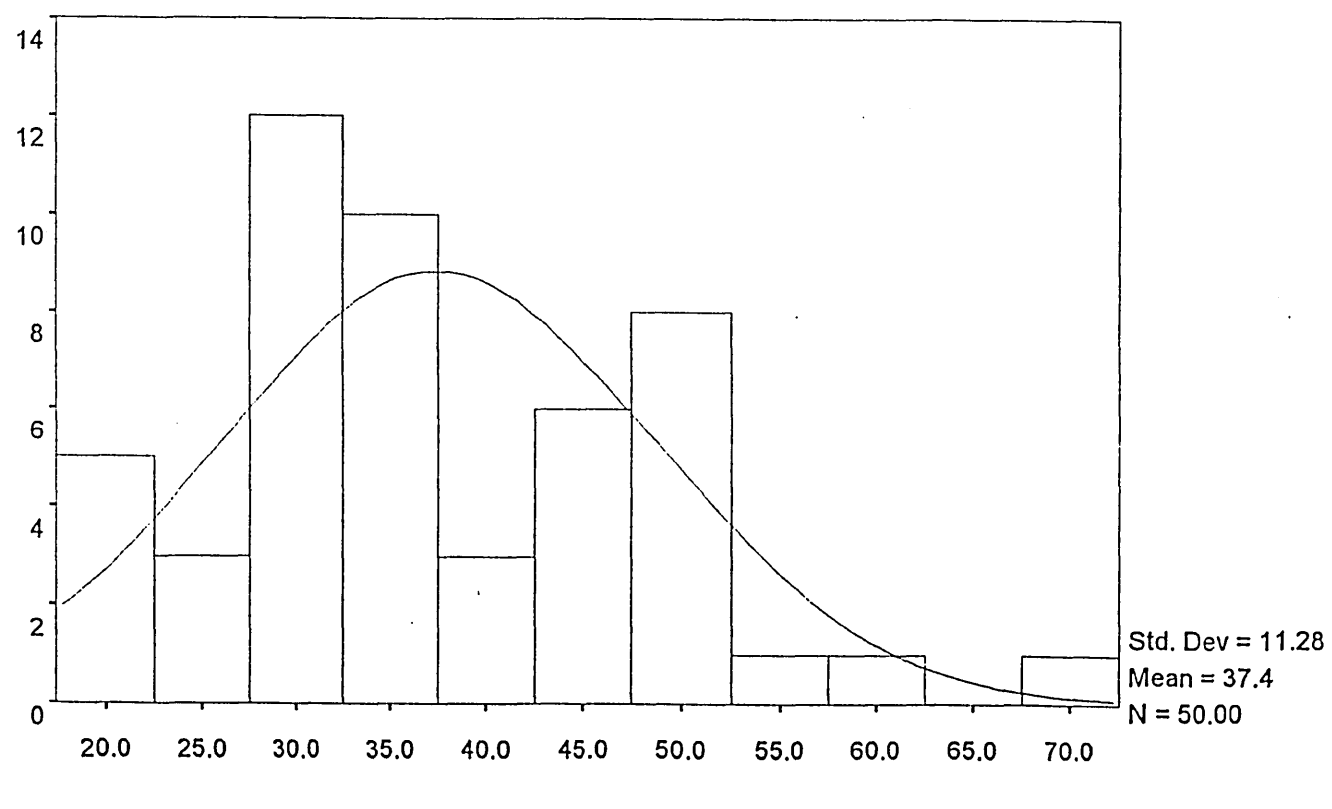
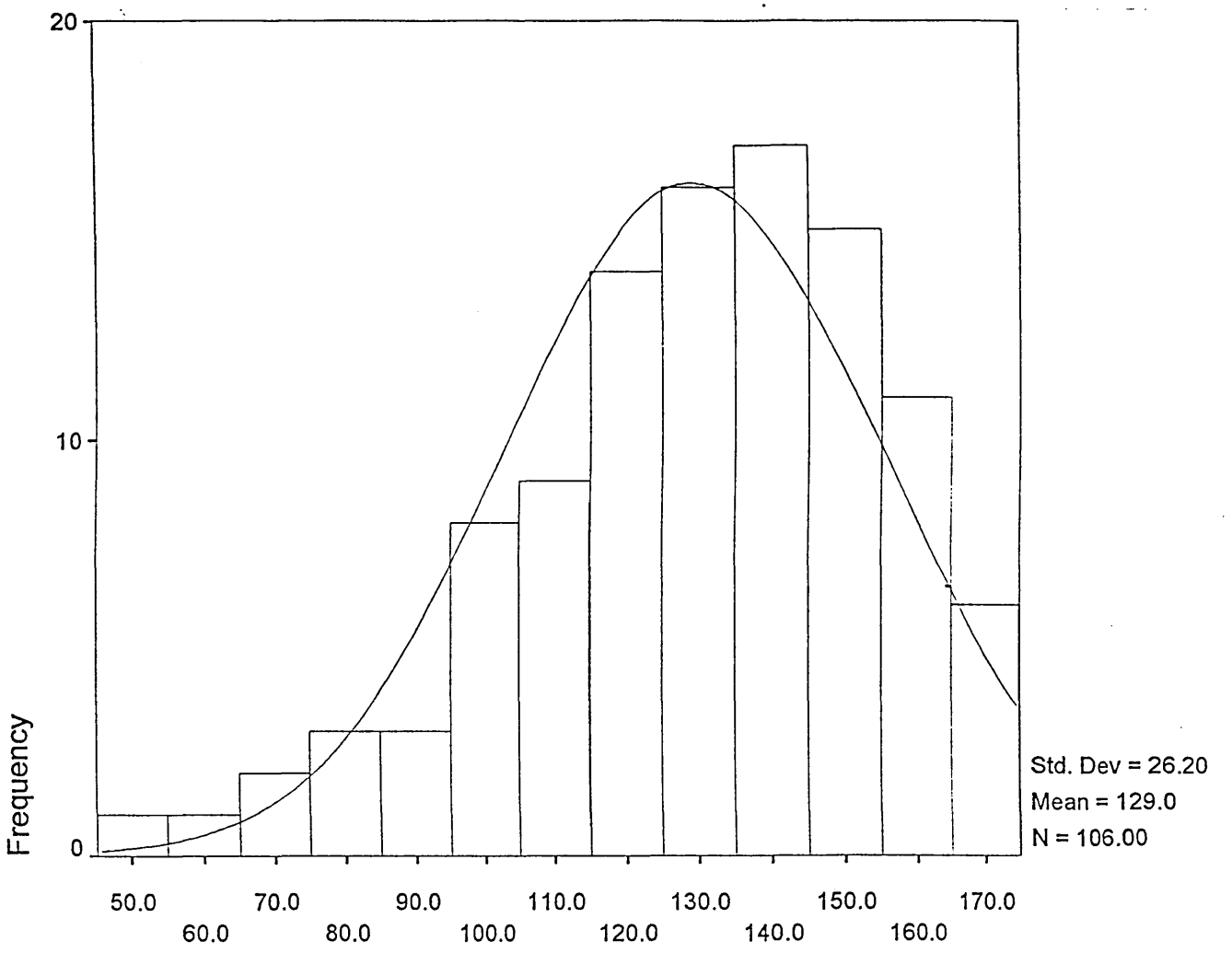


Table 12: Distribution of Age



APPENDIX XI: DISTRIBUTION OF OPEN UNIVERSITY MALE GROUP SCORES FROM STUDY 4

Table 1: Distribution of Sense of Coherence Total Score



Sense of Coherence Total Score

Table 2: Distribution of Comprehensibility Score

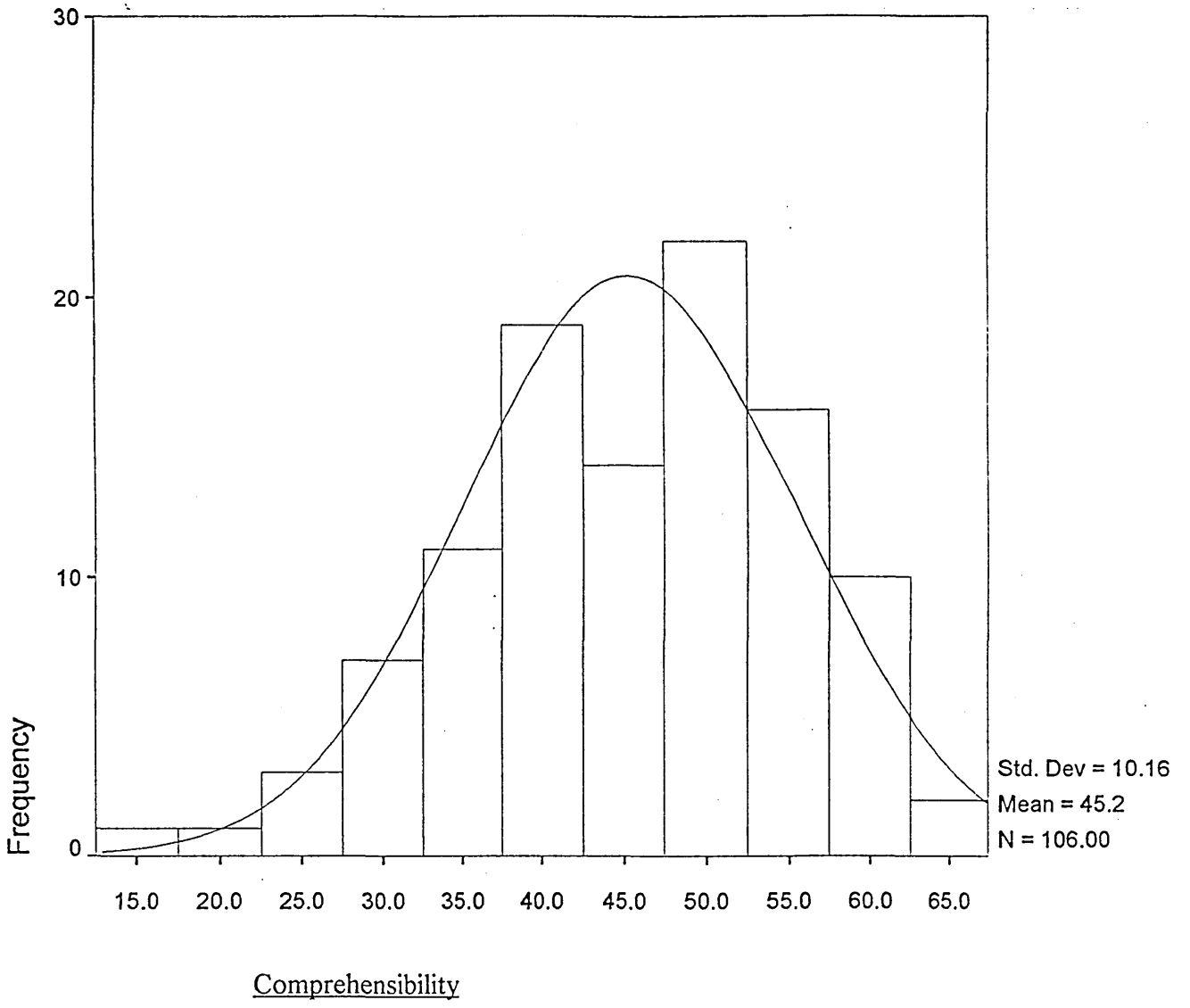
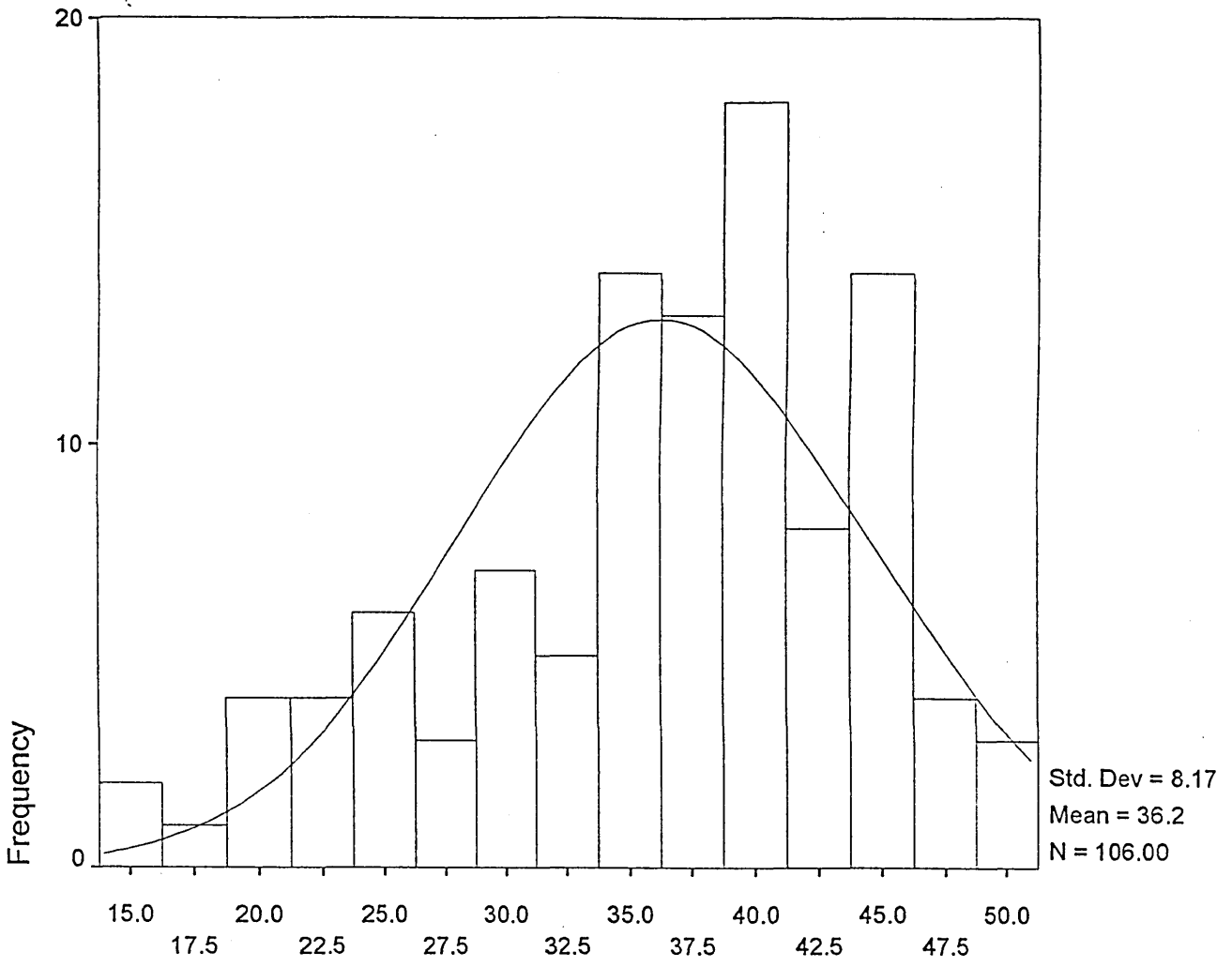
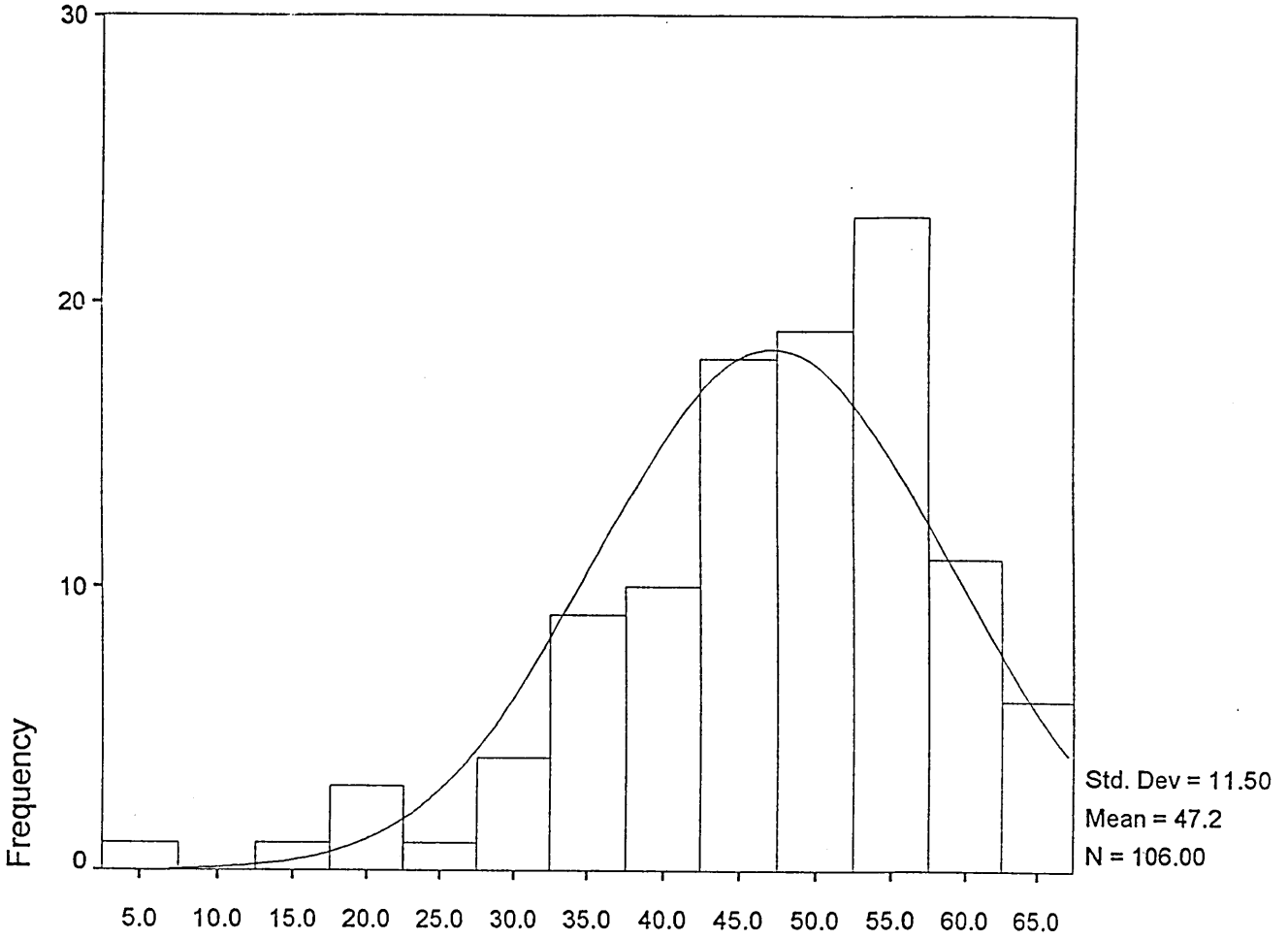


Table 3: Distribution of Meaningfulness Score



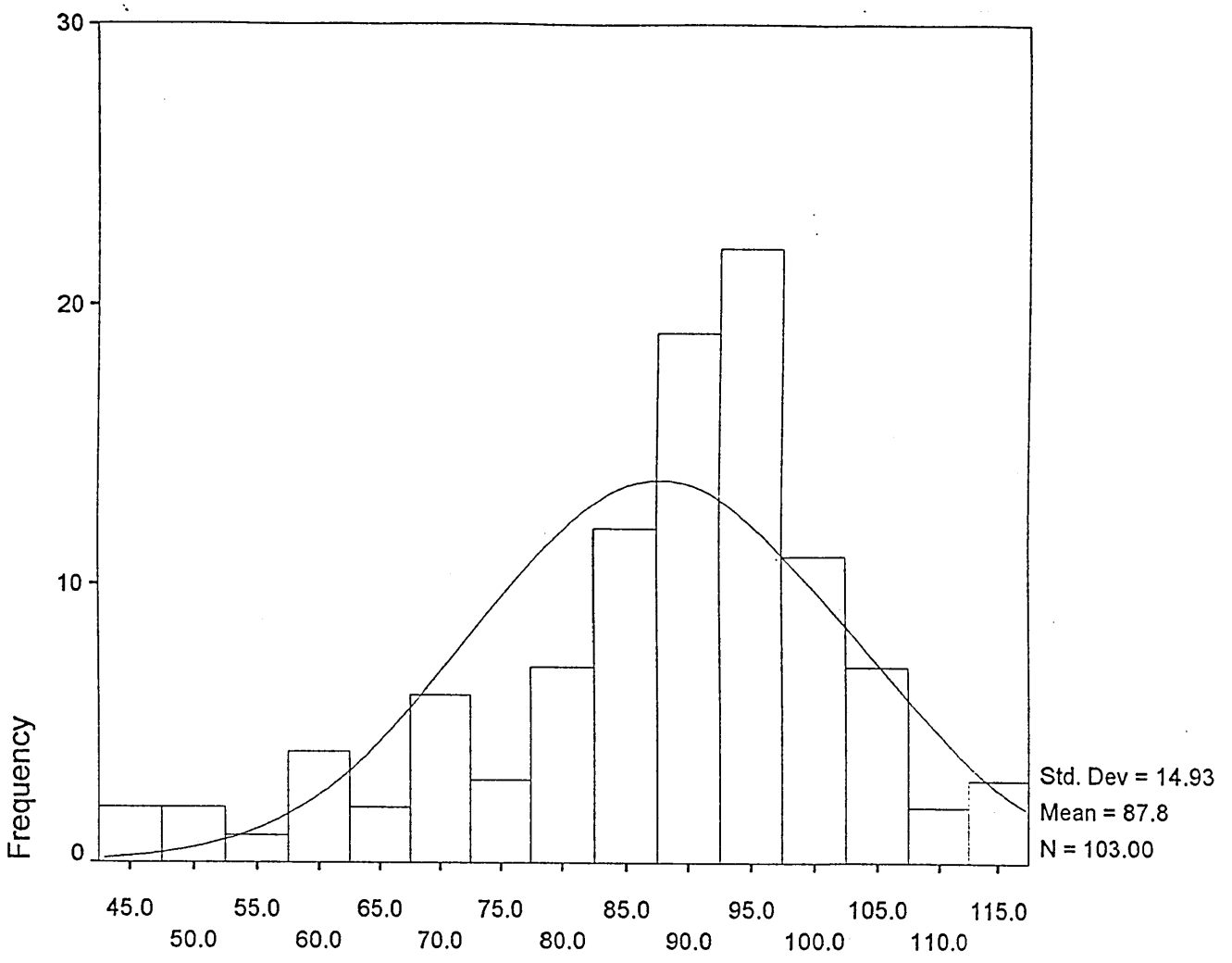
Meaningfulness

Table 4: Distribution of Manageability Score



Manageability

Table 5: Distribution of Hardiness Total Score



Hardiness Total Score

Table 6: Distribution of Challenge Score

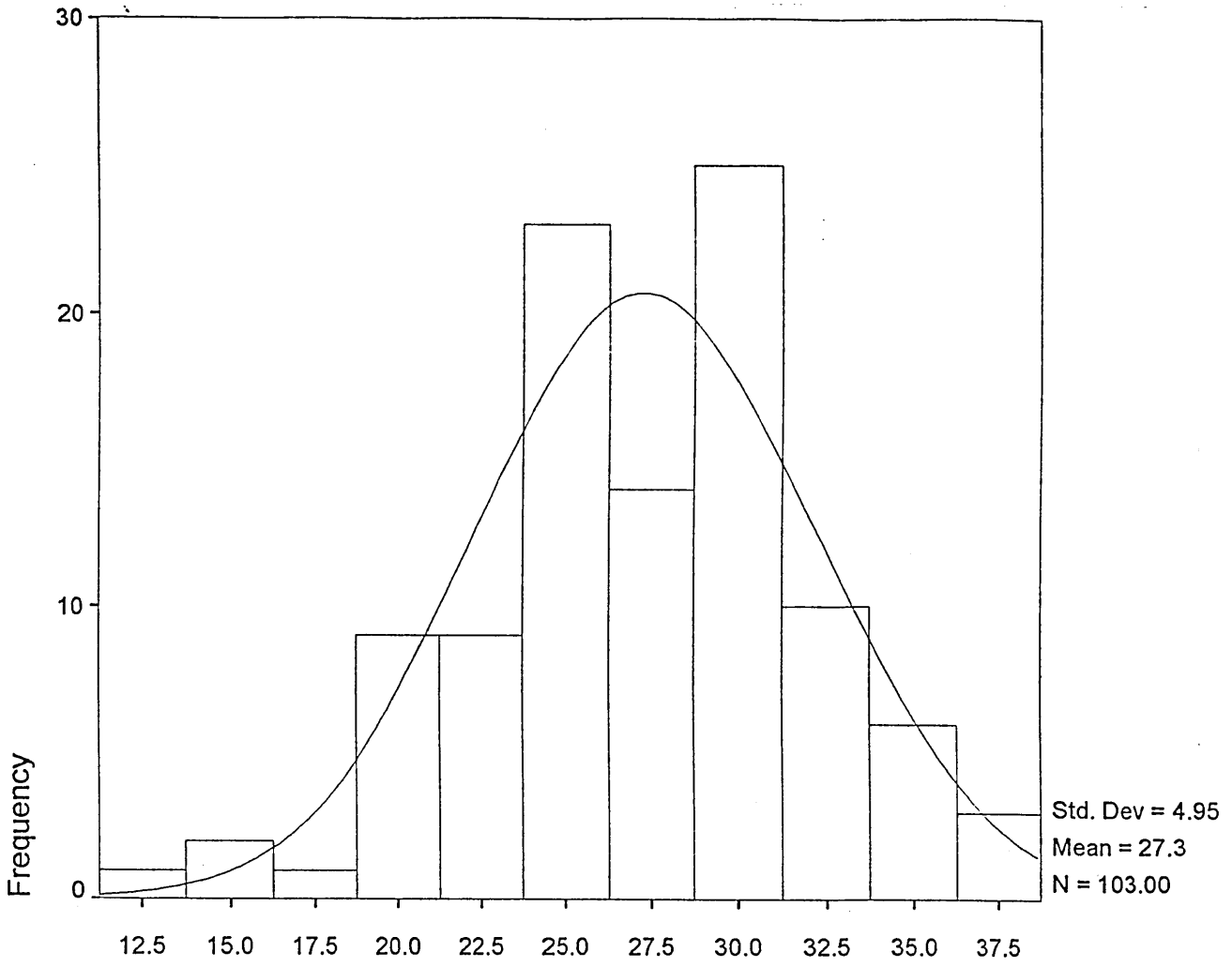


Table 7: Distribution of Control Score

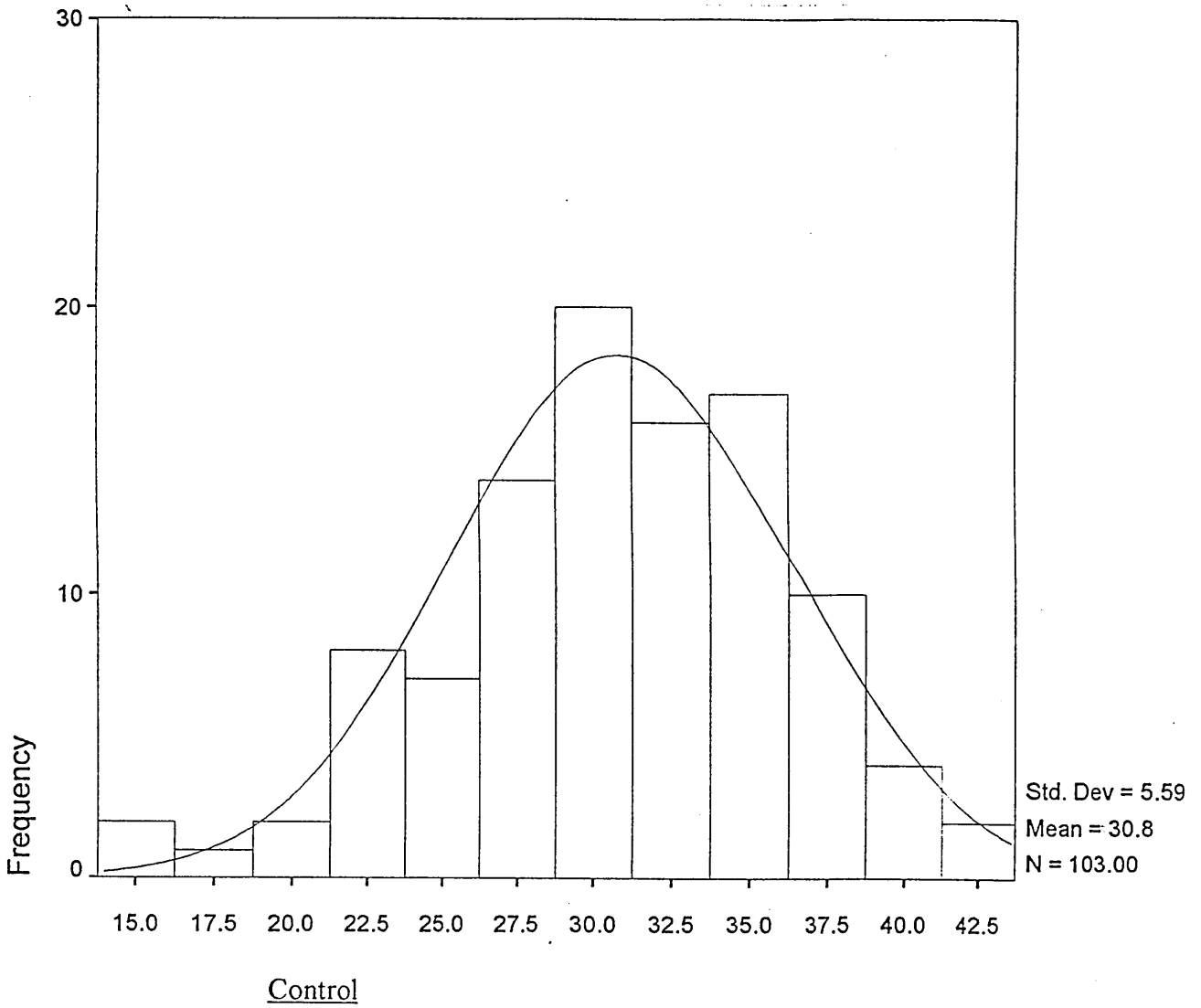


Table 8: Distribution of Commitment Score

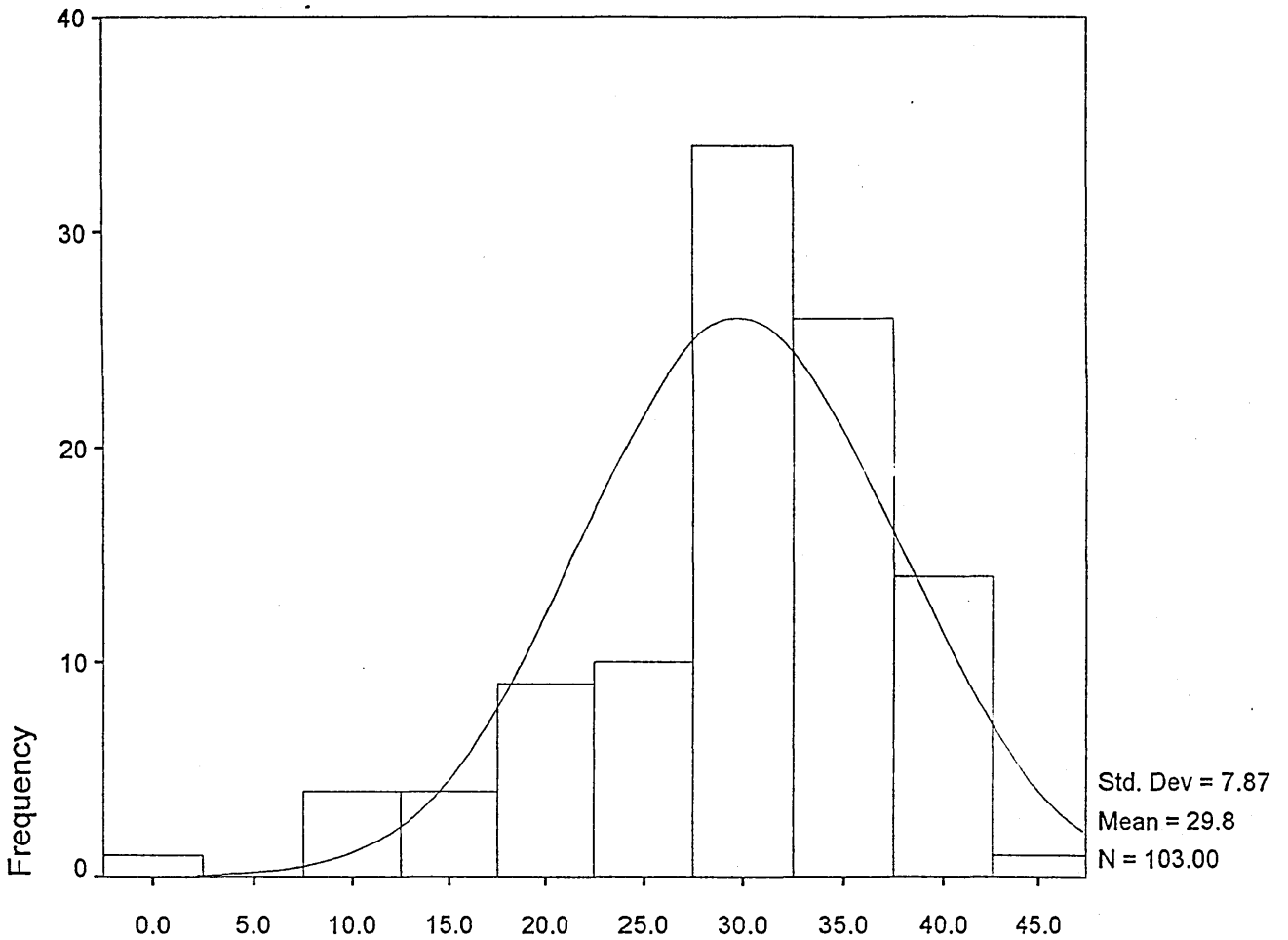


Table 9: Distribution of Neuroticism Score

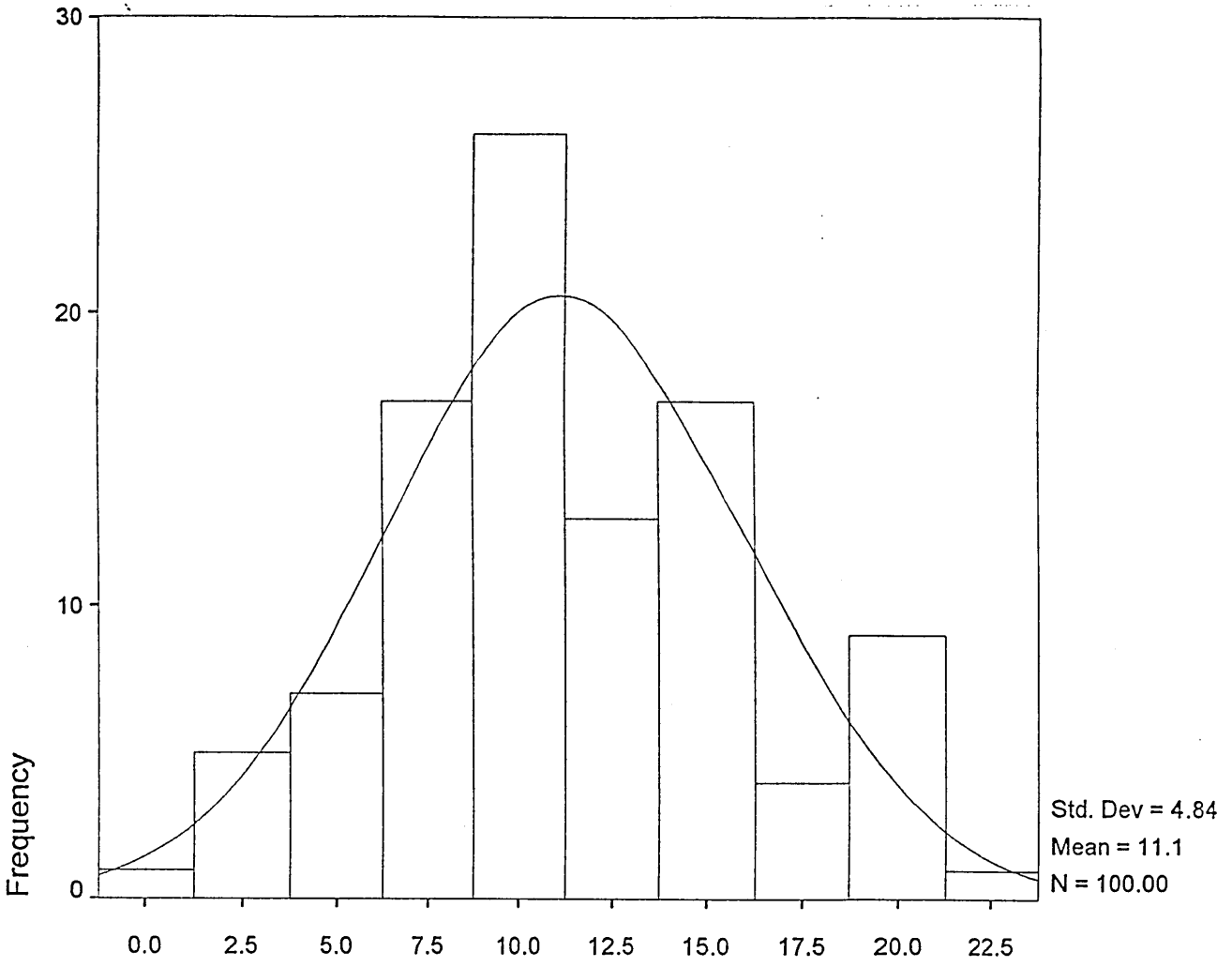


Table 10: Distribution of Extroversion

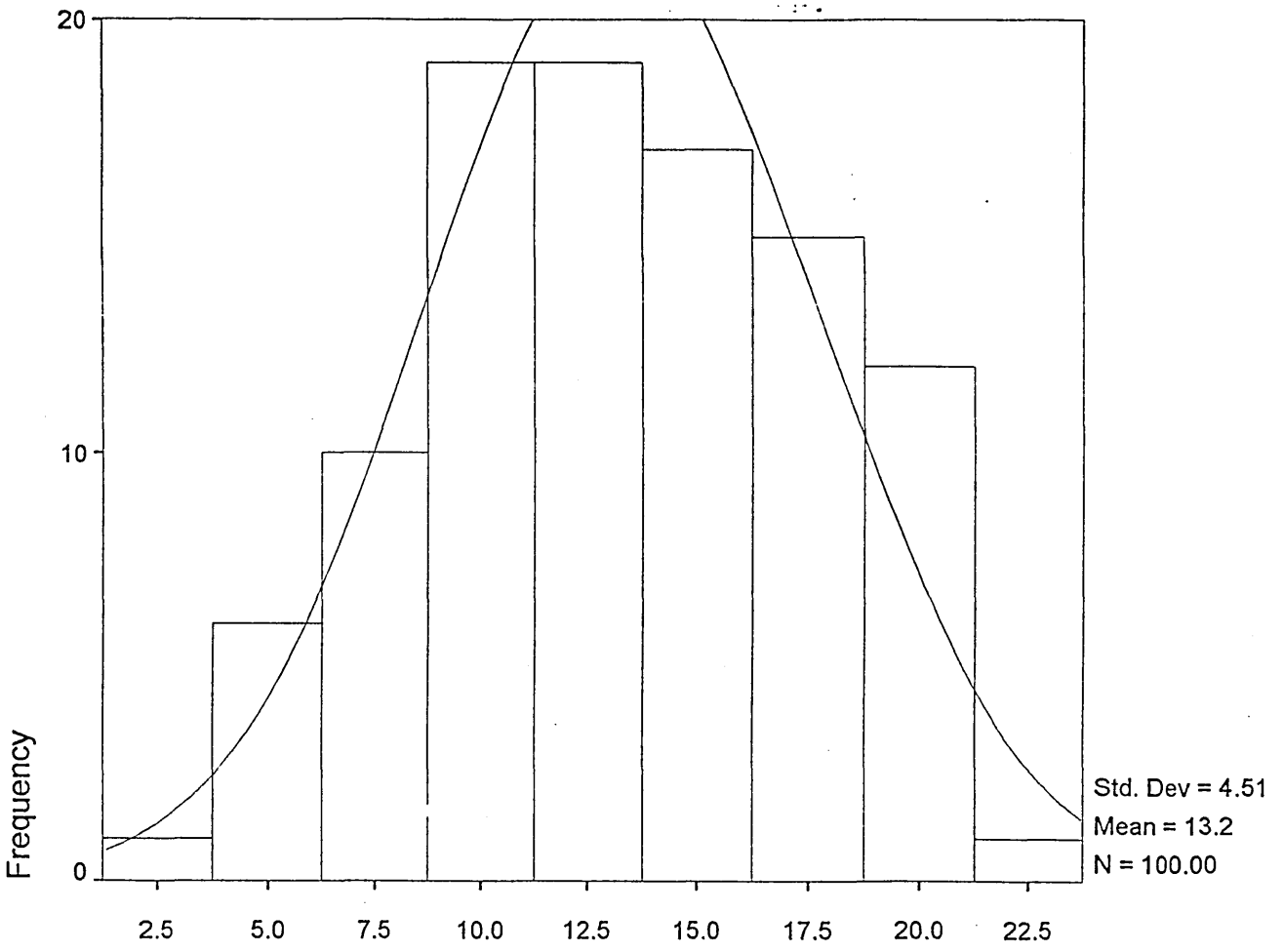
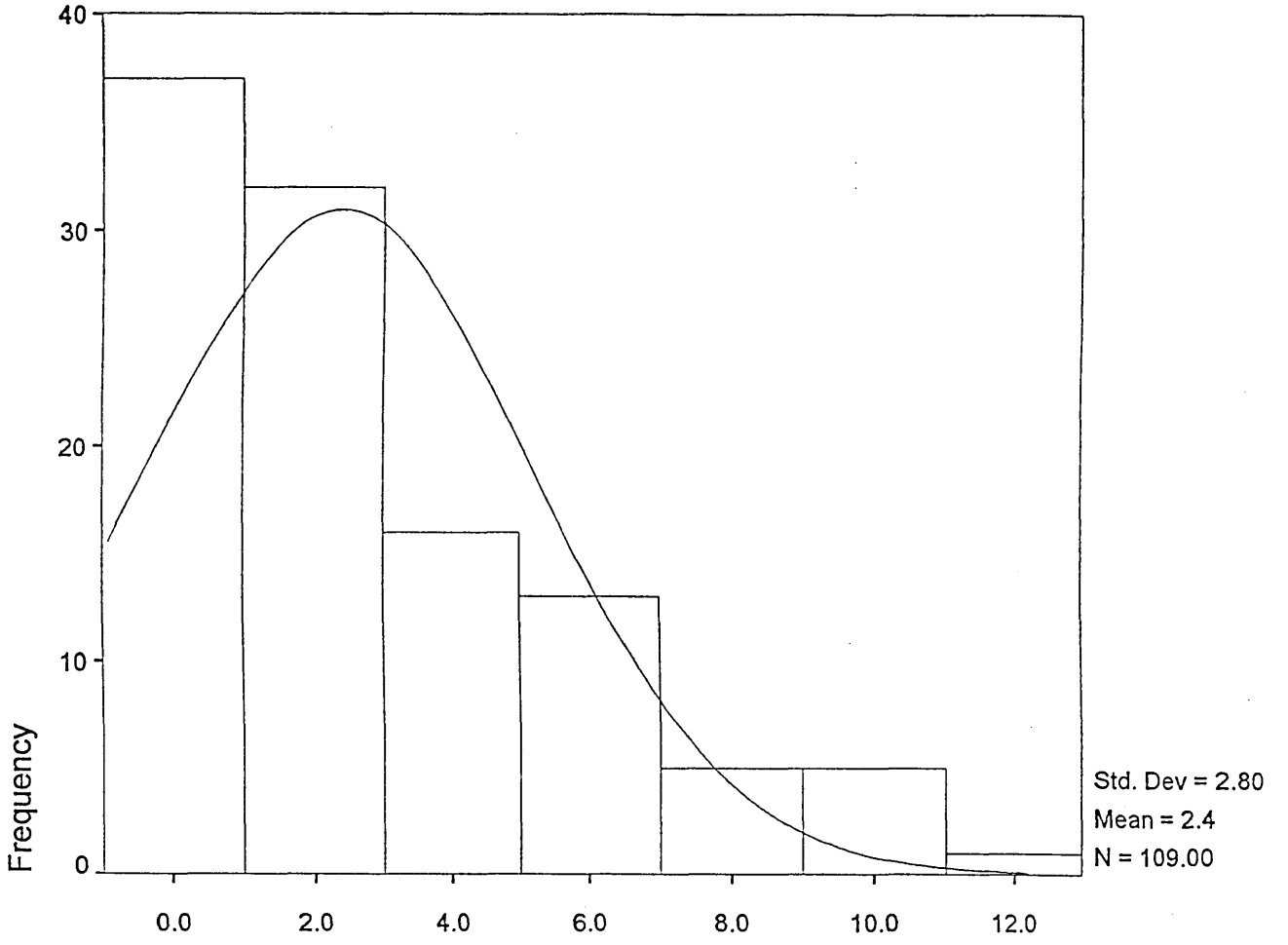
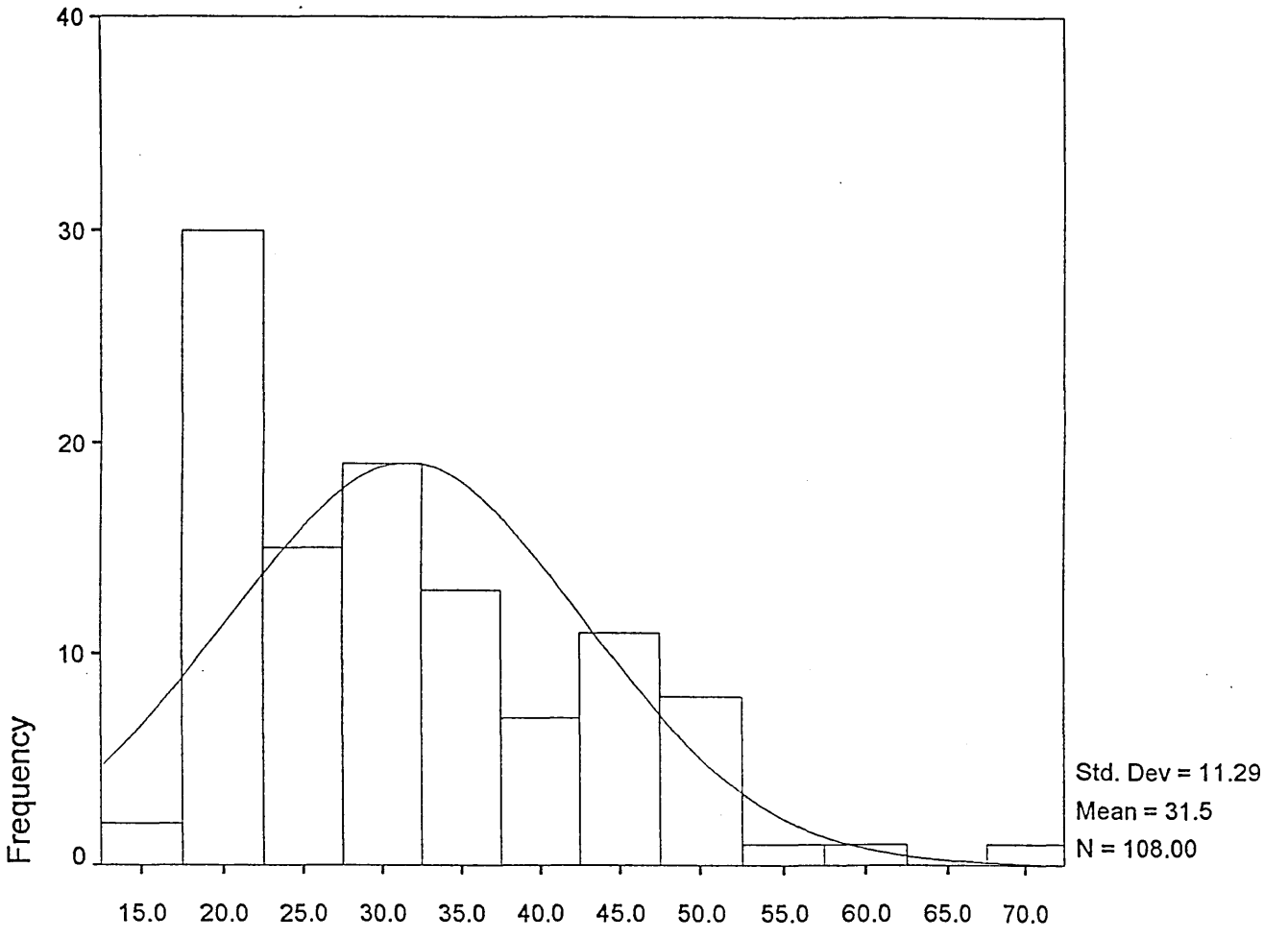


Table 11: Distribution of General Health Questionnaire Score XI-11



General Health Questionnaire Score

Table 12: Distribution of Age



Age

APPENDIX XII: DISTRIBUTION OF ABERDEEN MALE GROUP SCORES FROM STUDY 4

Table 1: Distribution of Sense of Coherence Total Score

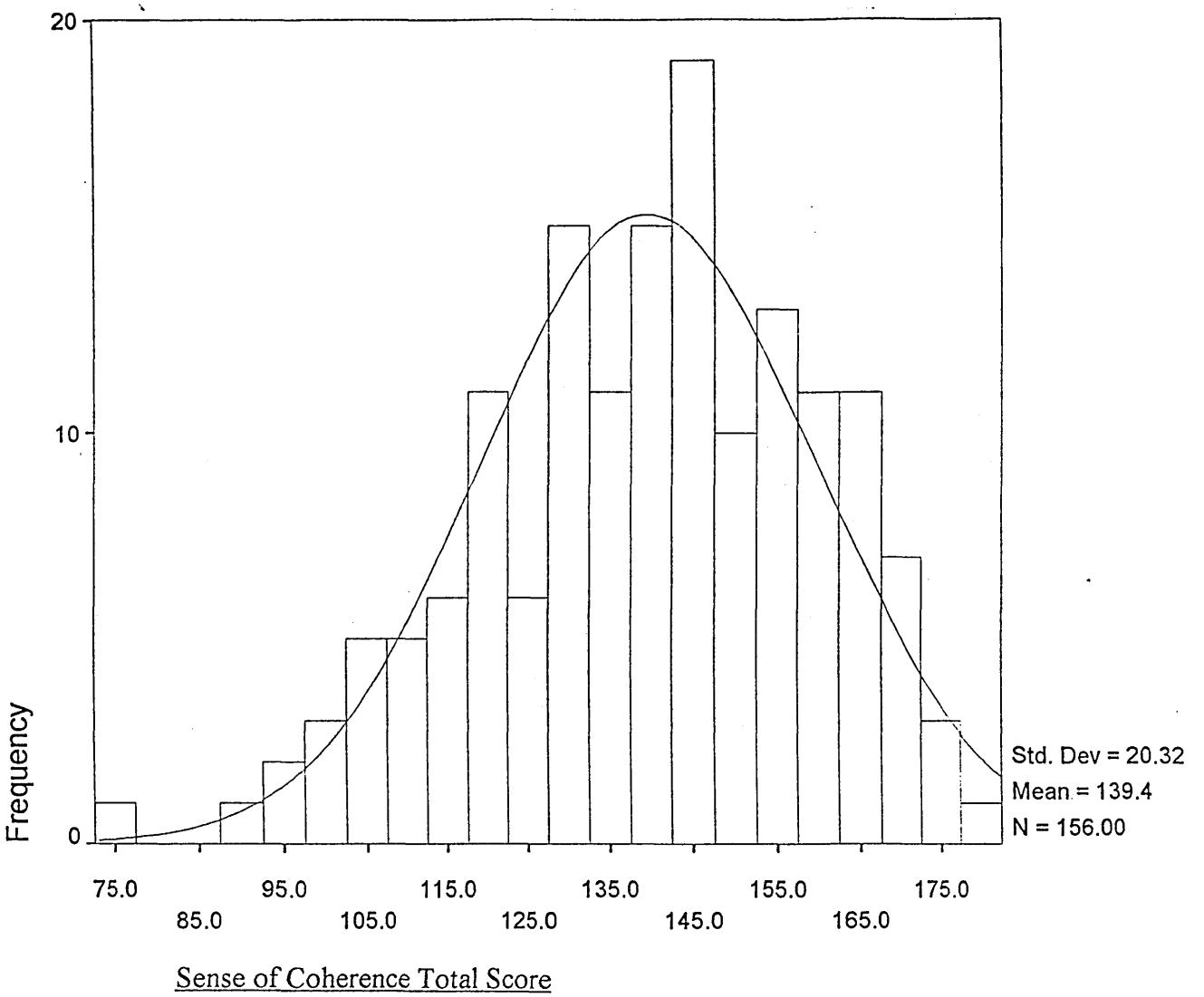
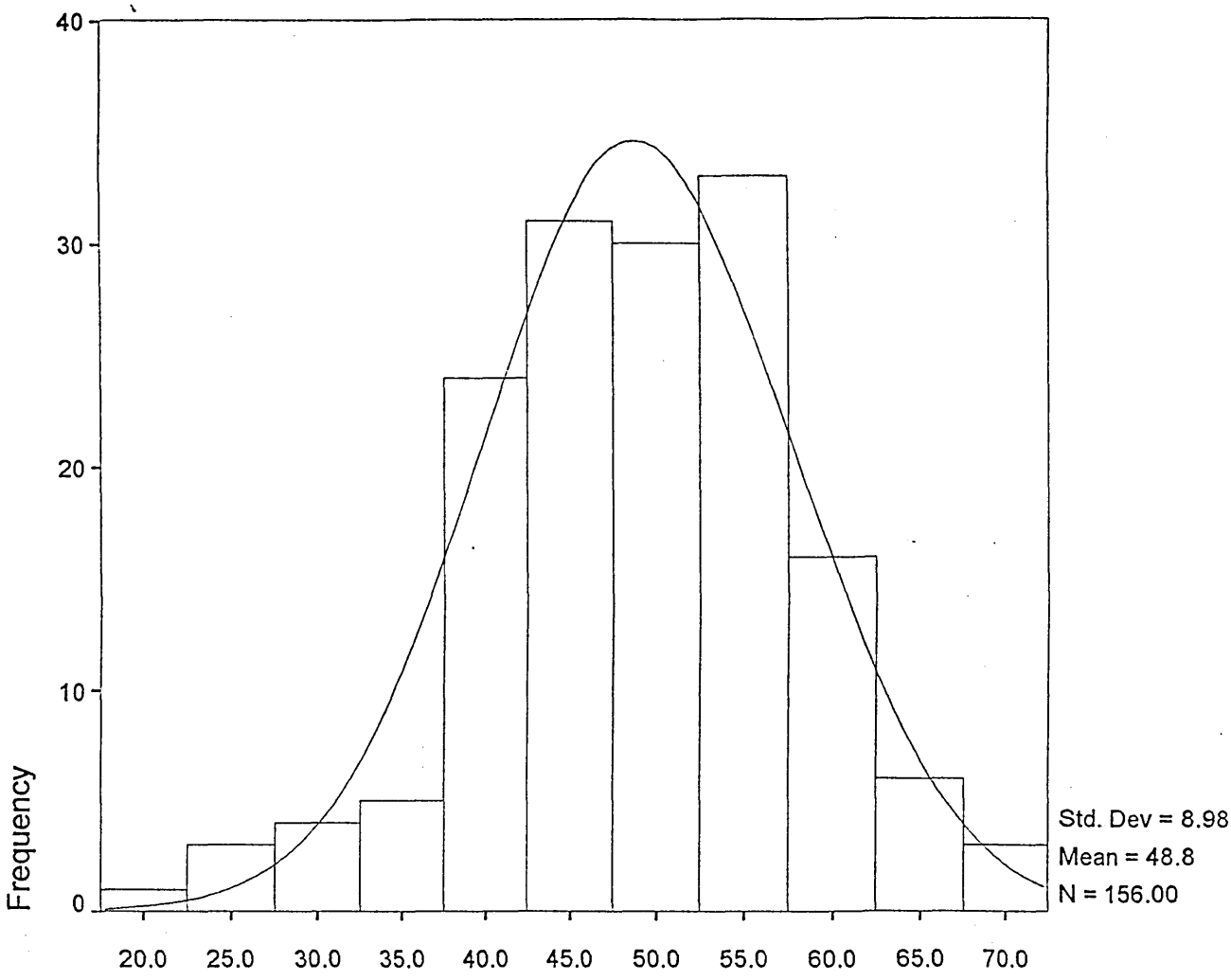
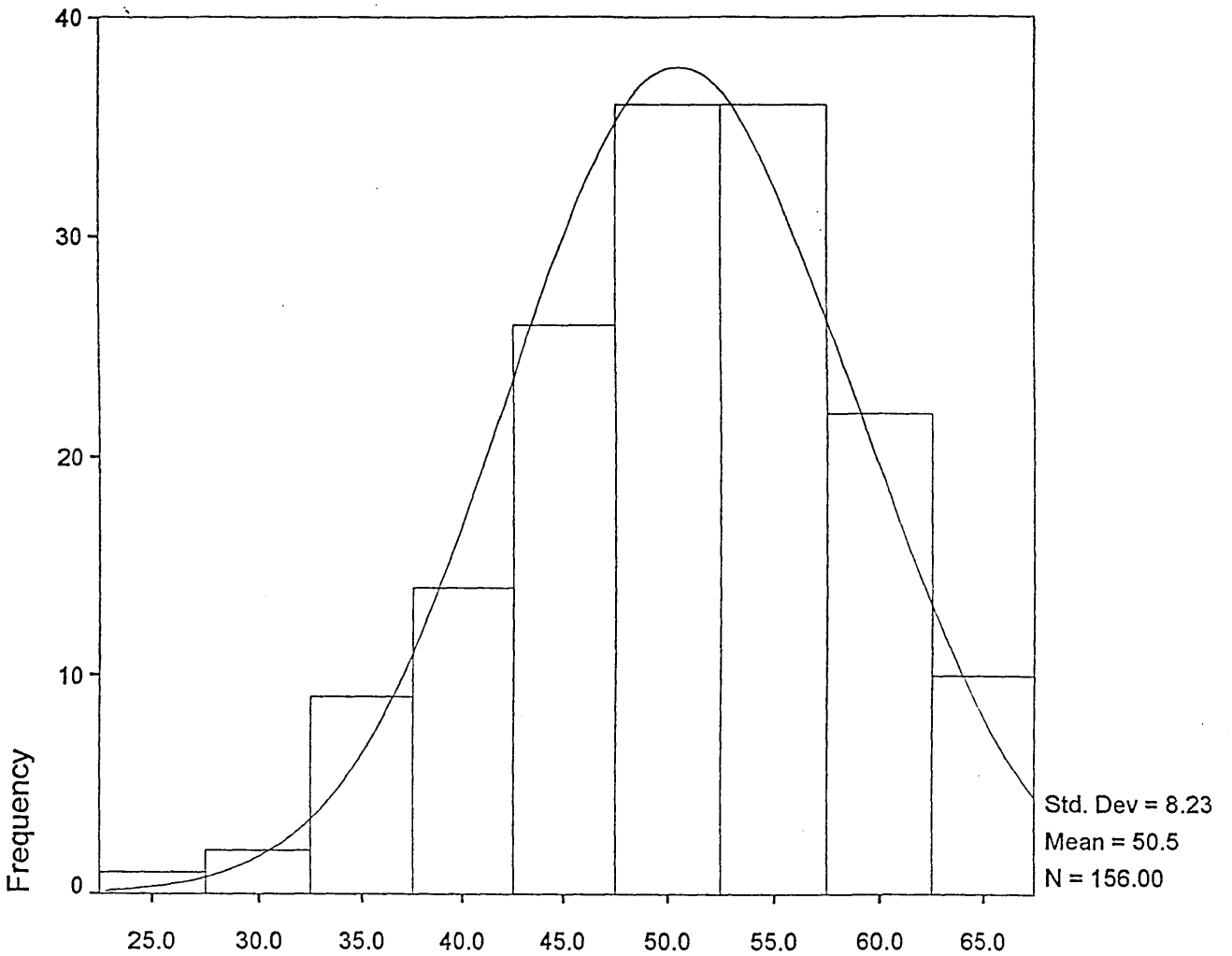


Table 2: Distribution of Comprehensibility Score



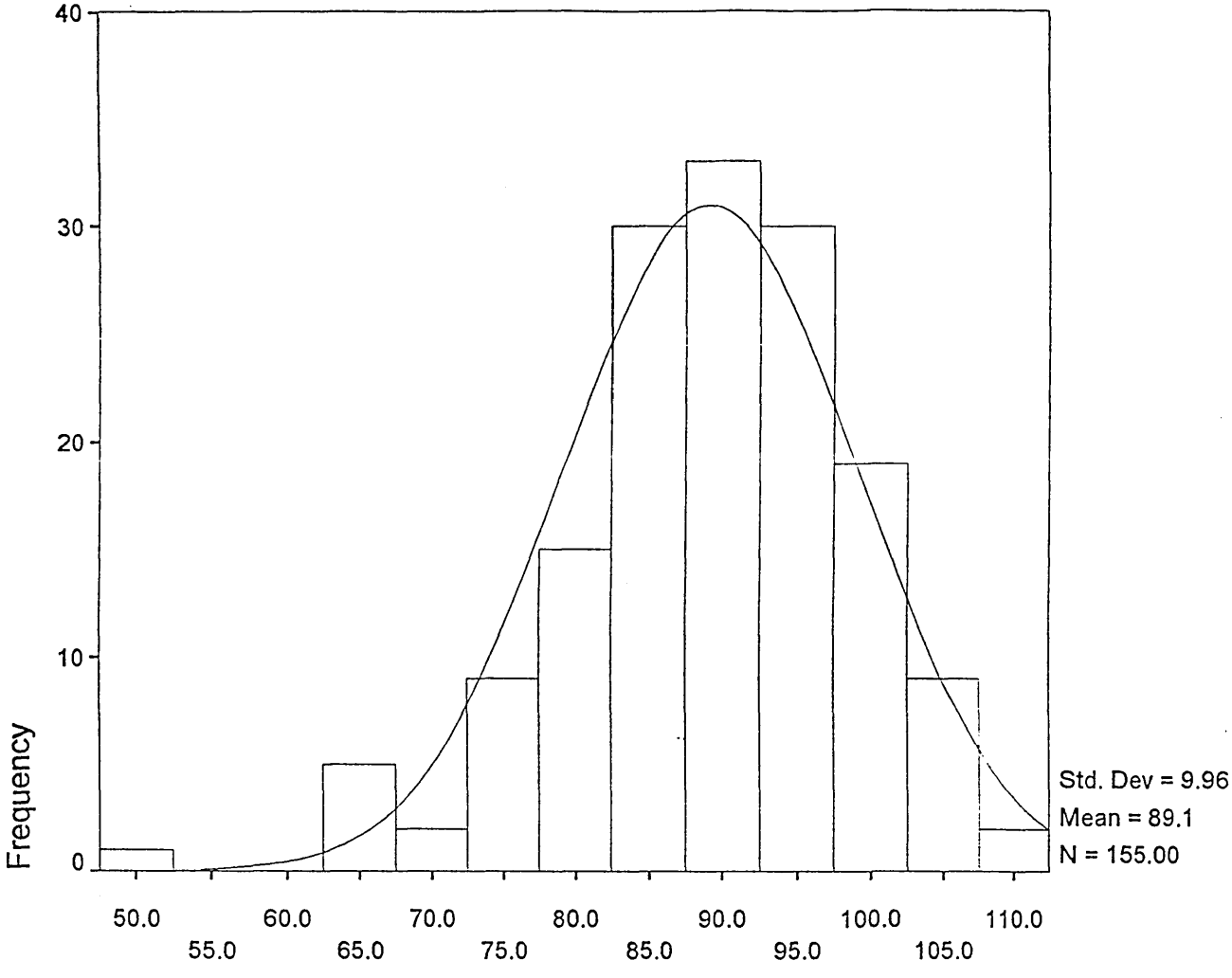
Comprehensibility

Table 4: Distribution of Manageability Score



Manageability

Table 5: Distribution of Hardiness Total Score



Hardiness Total Score

Table 6: Distribution of Challenge Score

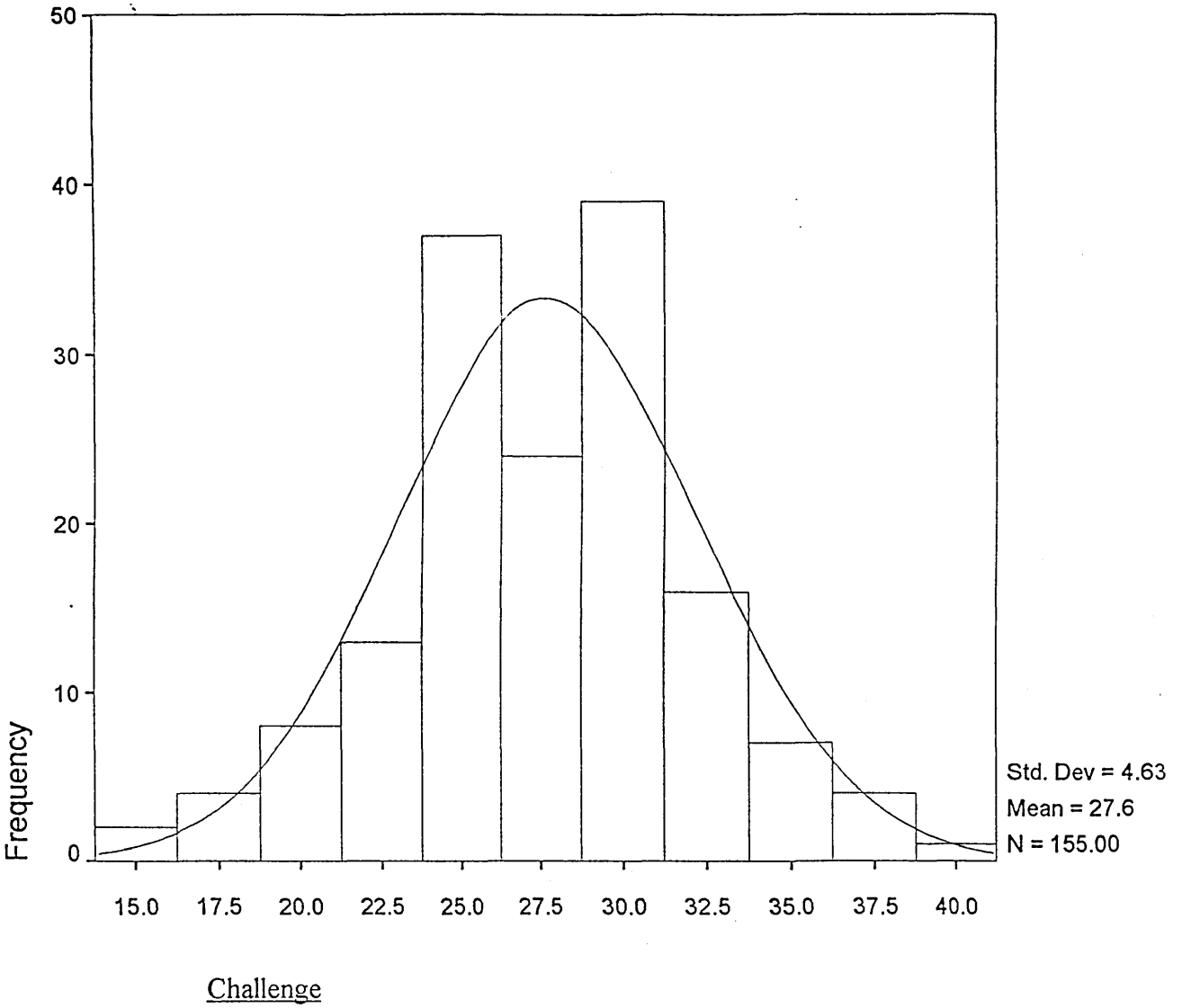


Table 8: Distribution of Commitment Score

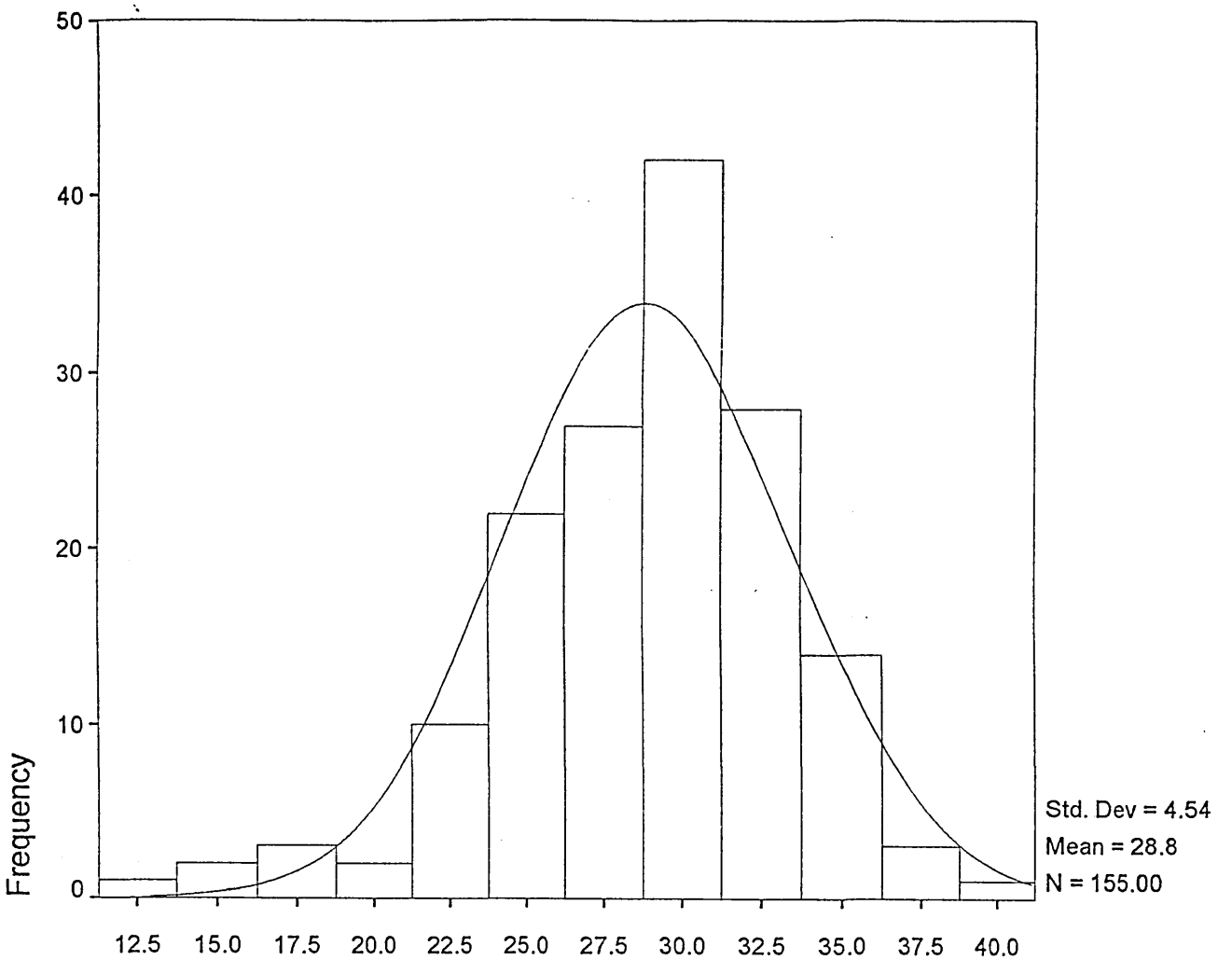


Table 7: Distribution of Control Score

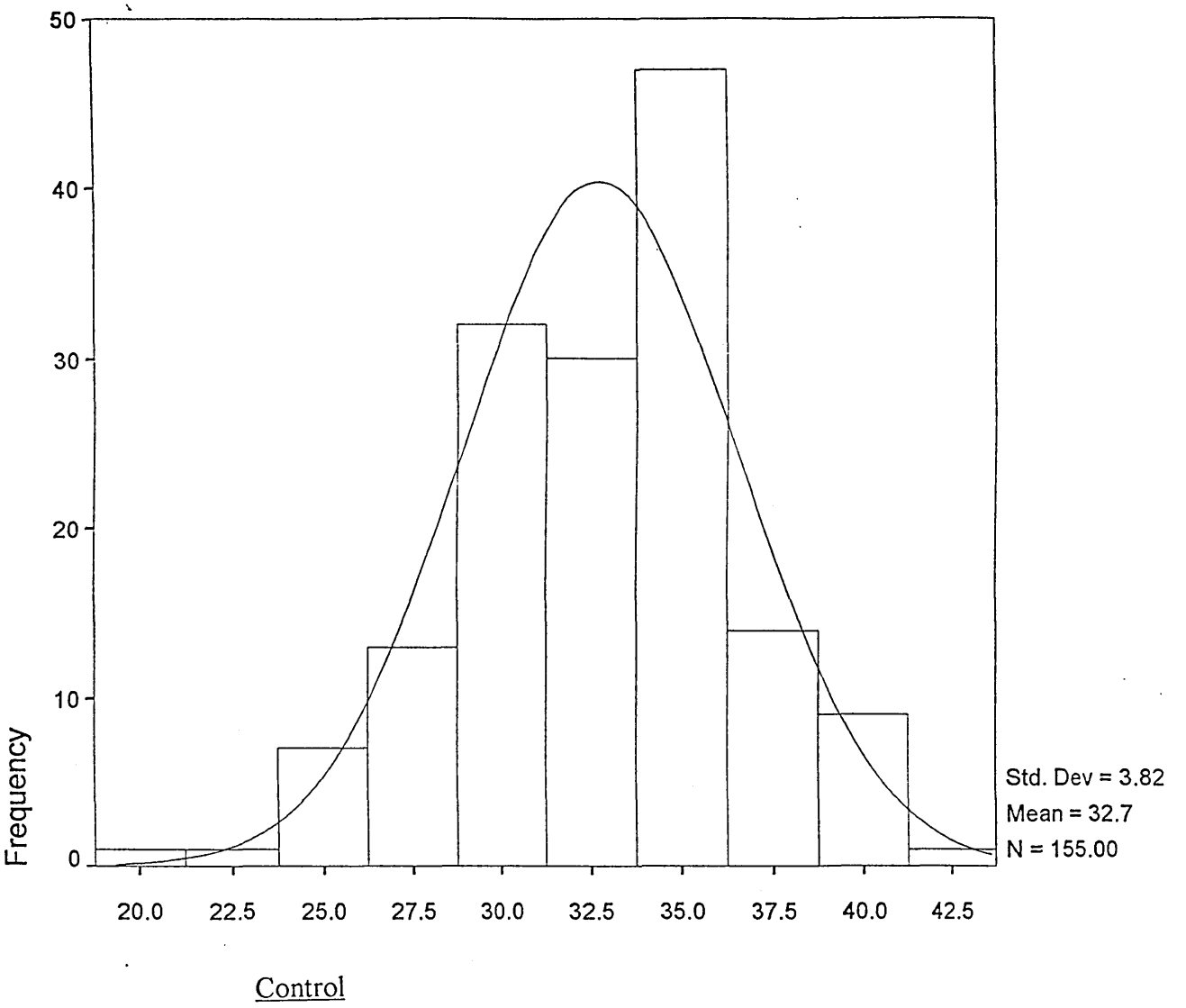


Table 9: Distribution of Neuroticism Score

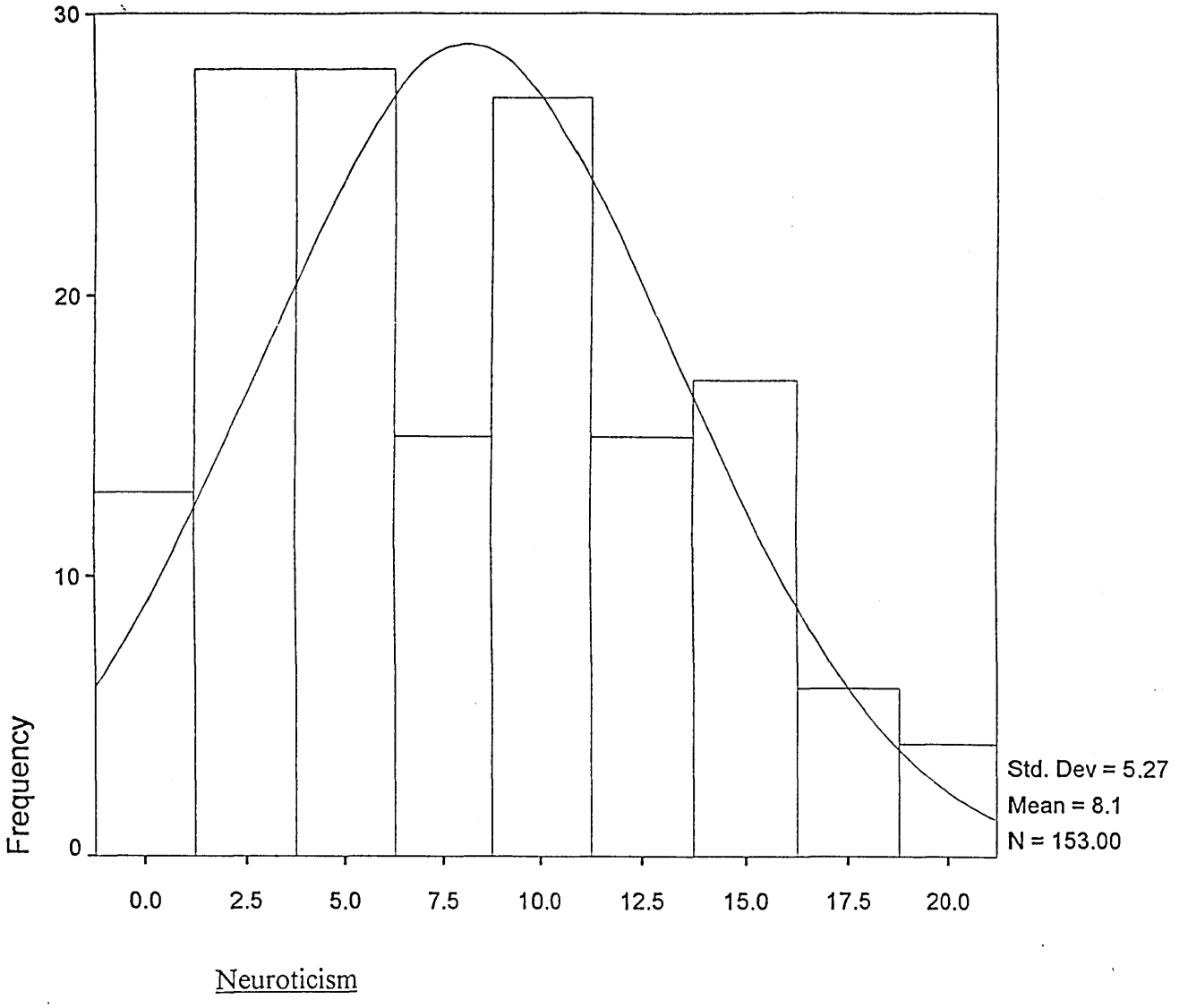
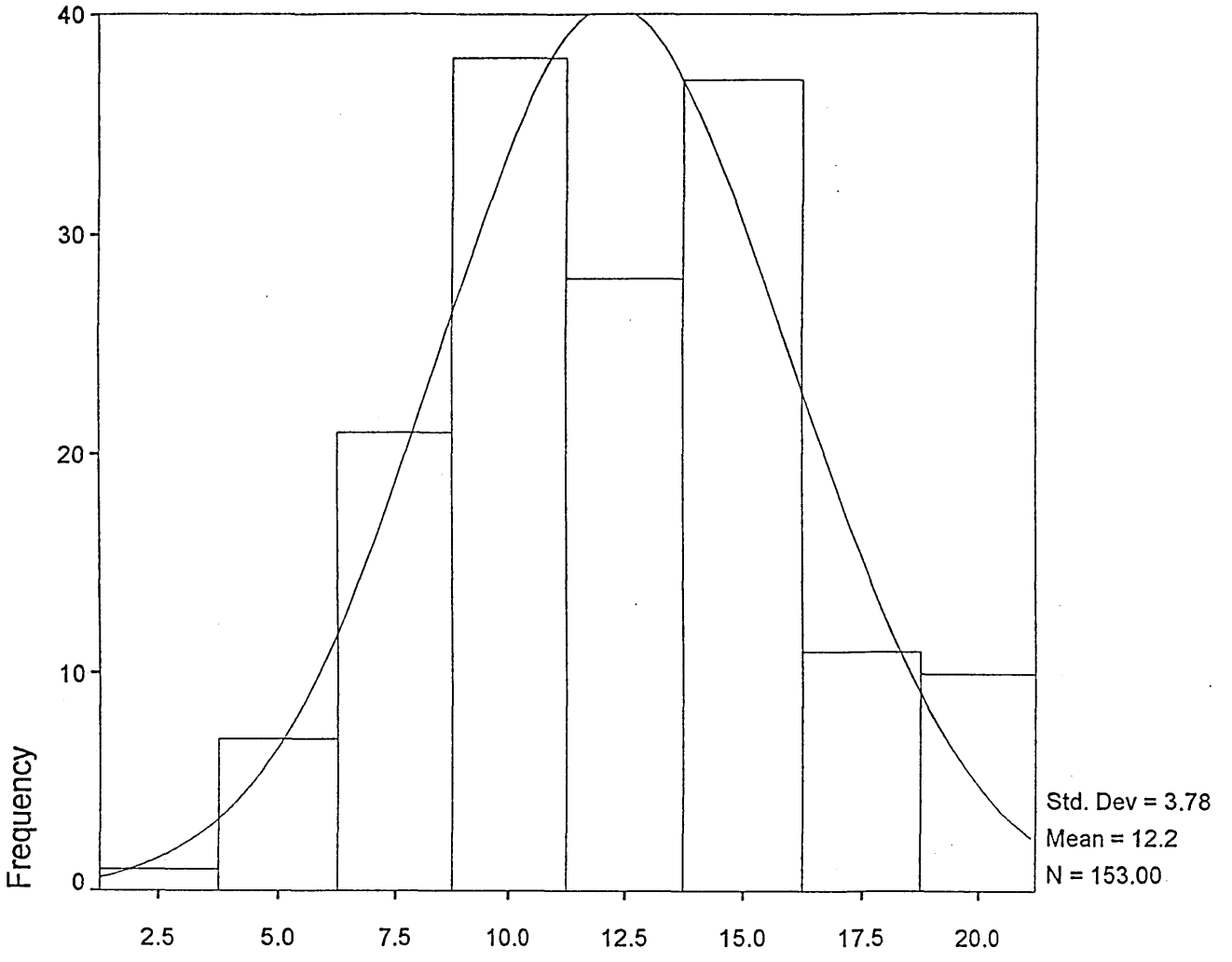
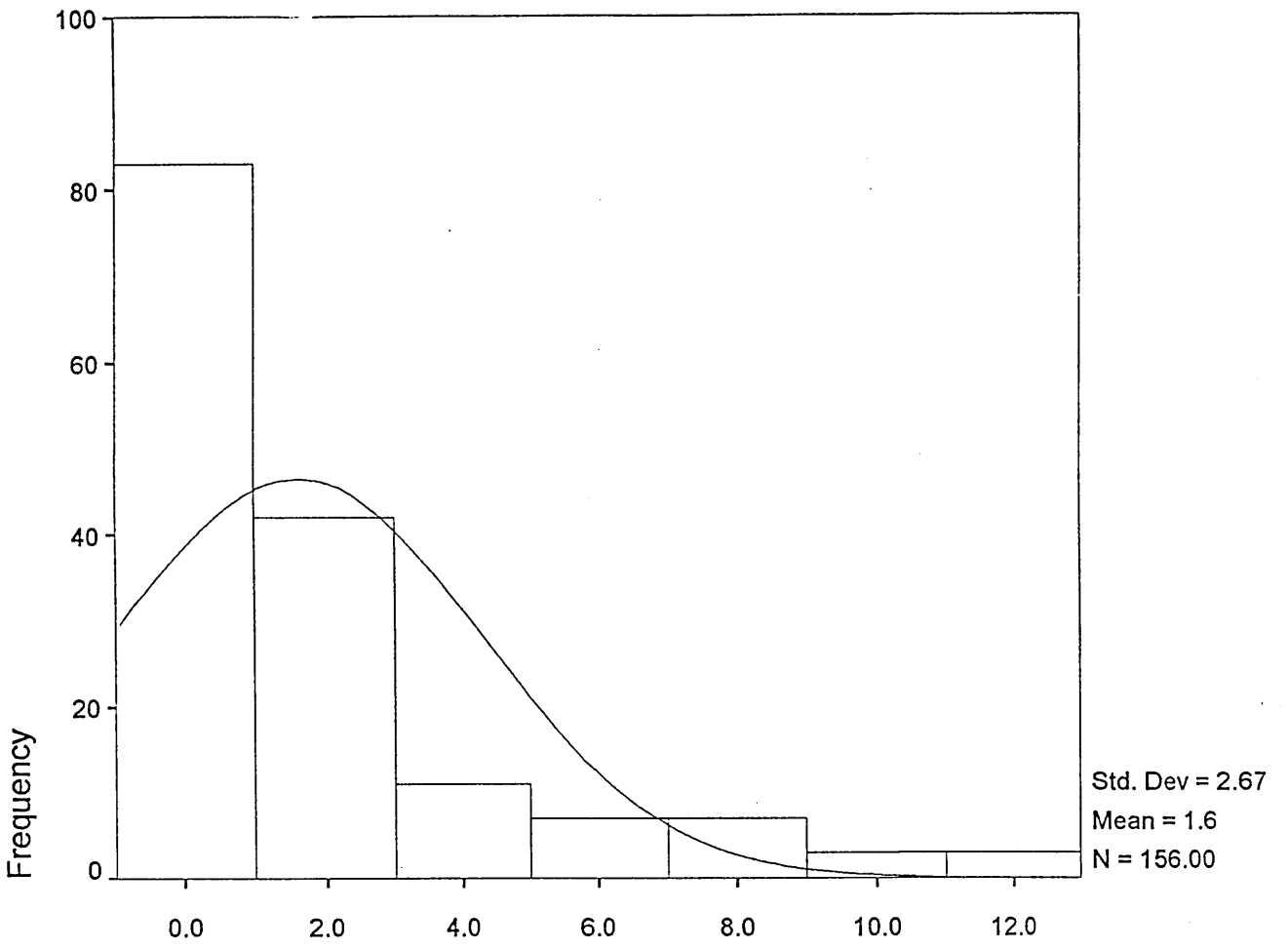


Table 10: Distribution of Extroversion



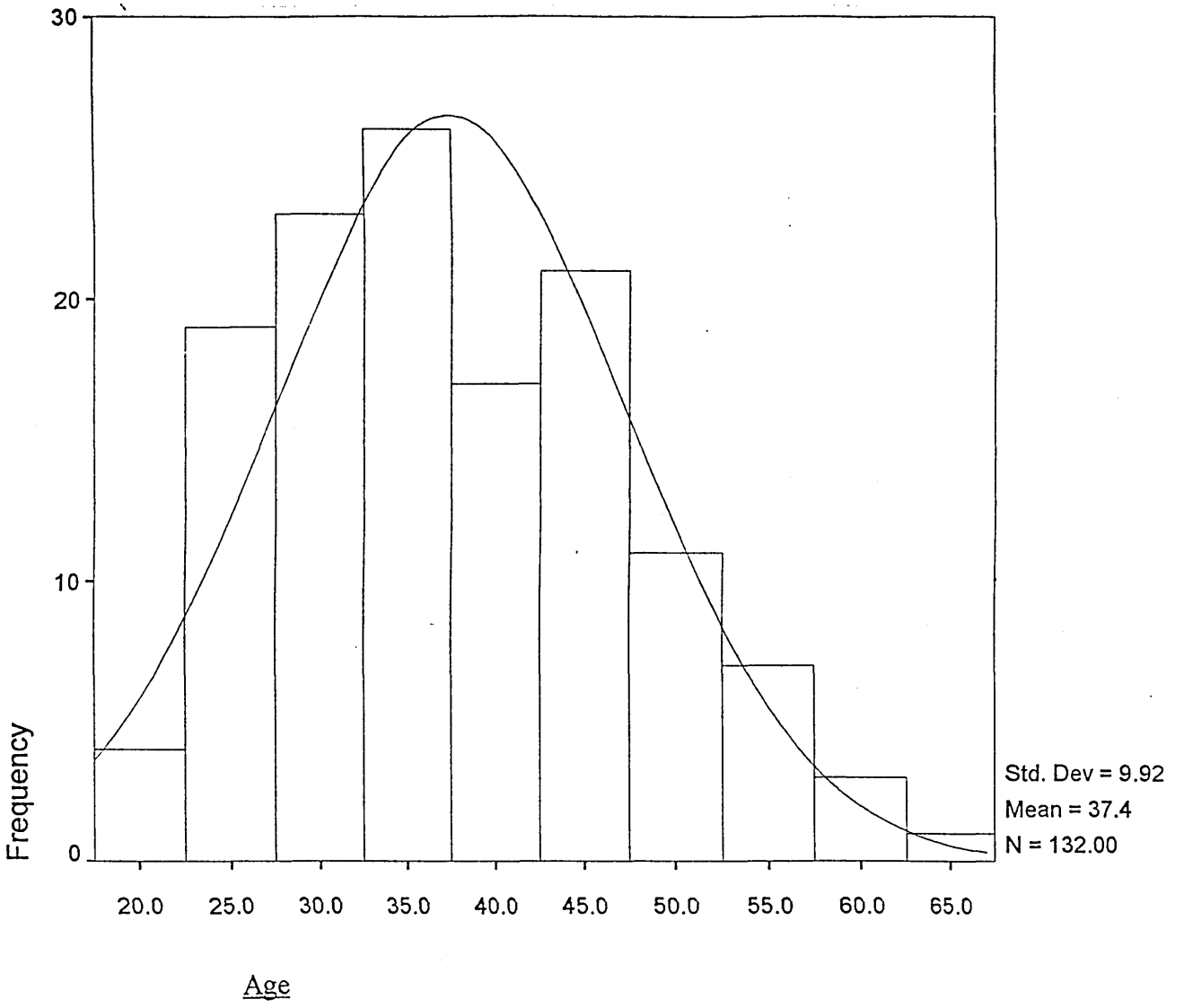
Extroversion

Table 11: Distribution of General Health Questionnaire Score



General Health Questionnaire Score

Table 12: Distribution of Age



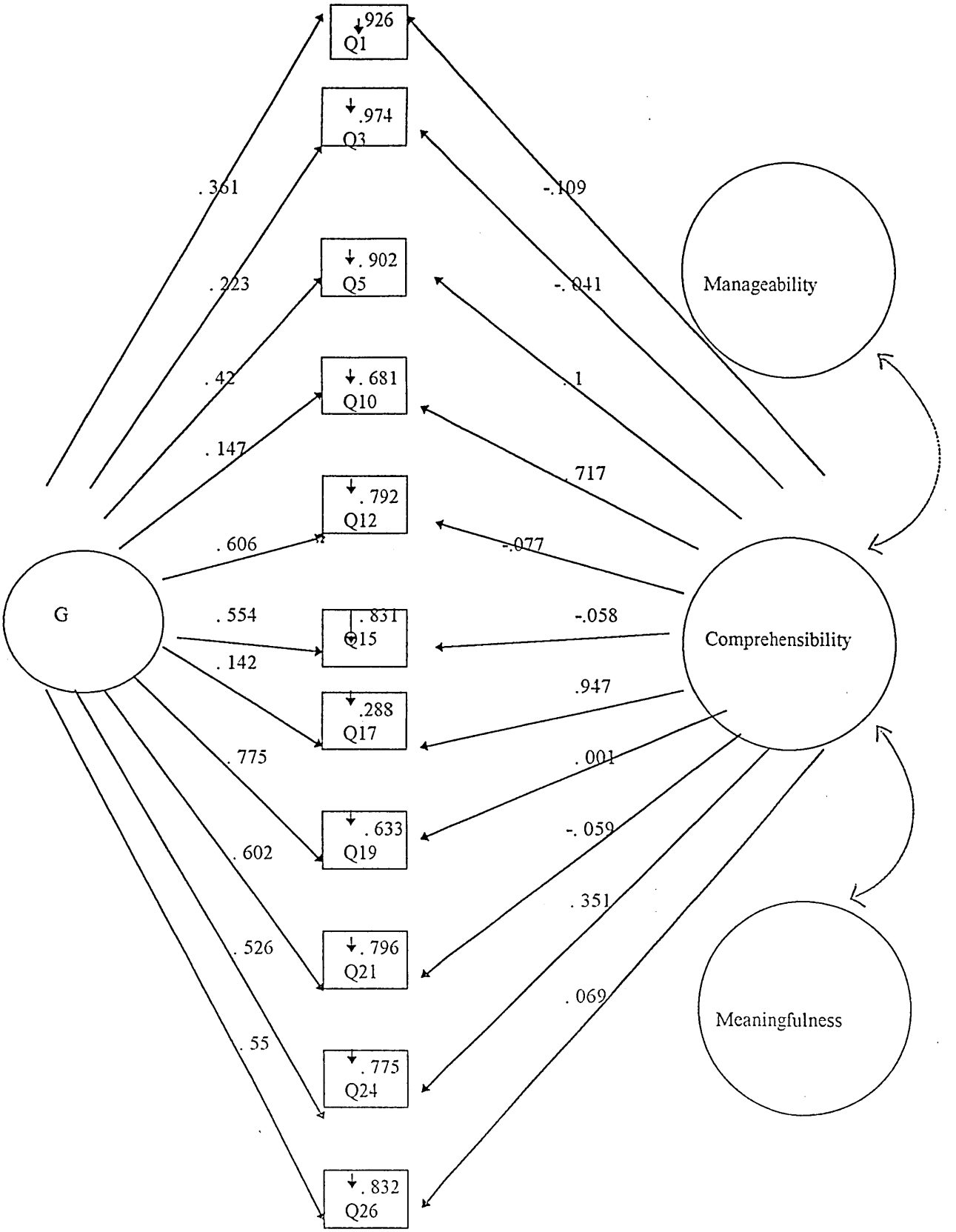
APPENDIX XIII: (STUDY 4)CONFIRMATORY FACTOR ANALYTIC MODELS NOT REPORTED IN THE RESULTS SECTION. DETAILS OF LAGRANGE MULTIPLIER AND WALD TESTS.

Figure 1 Part 1. Loadings of Comprehensibility and the General Sense of Coherence Factor on the Items Considered by Antonovsky (1987) to Comprise the Dimension of Comprehensibility. Using the Open University Female Group. (Next Page)

Graphical representation of a confirmatory factor analytic model in which the Sense of Coherence Questionnaire simultaneously has three related factors; Comprehensibility, Manageability and Meaningfulness and one general factor. Due to the number of items in the scale (manifest variables) it was not possible to represent this on one page. The factor loadings of Comprehensibility, Manageability and Meaningfulness on their respective items are therefore presented separately over 3 pages.

Part 1 represents the loadings of Comprehensibility, part 2 represents the loadings of Manageability and part 3 represents the loadings of Meaningfulness on the manifest variables. The details of the loadings of the general factor on the items which constitute each separate dimension are present in each part of the figure.

The latent variables are represented as circles; G = general. The manifest variables are represented as squares. The numbers above each arrow pointing from the latent variables to the manifest variables represent the standardised loadings of each manifest variable on its respective latent variable. Each manifest variable also has an error component; these are presented alongside the arrows which appear above each manifest variable.


.926
Q1
.974
Q3
. 902
Q5
. 681
Q10
. 792
Q12
. 831
Q15
.288
Q17
. 633
Q19
. 796
Q21
. 775
Q24
. 832
Q26
G
Manageability
Comprehensibility
Meaningfulness
. 361
. 223
. 42
. 147
. 606
. 554
. 142
. 775
. 602
. 526
. 55
-. 109
-. 041
. 1
. 717
-. 077
-. 058
. 947
. 001
-. 059
. 351
. 069

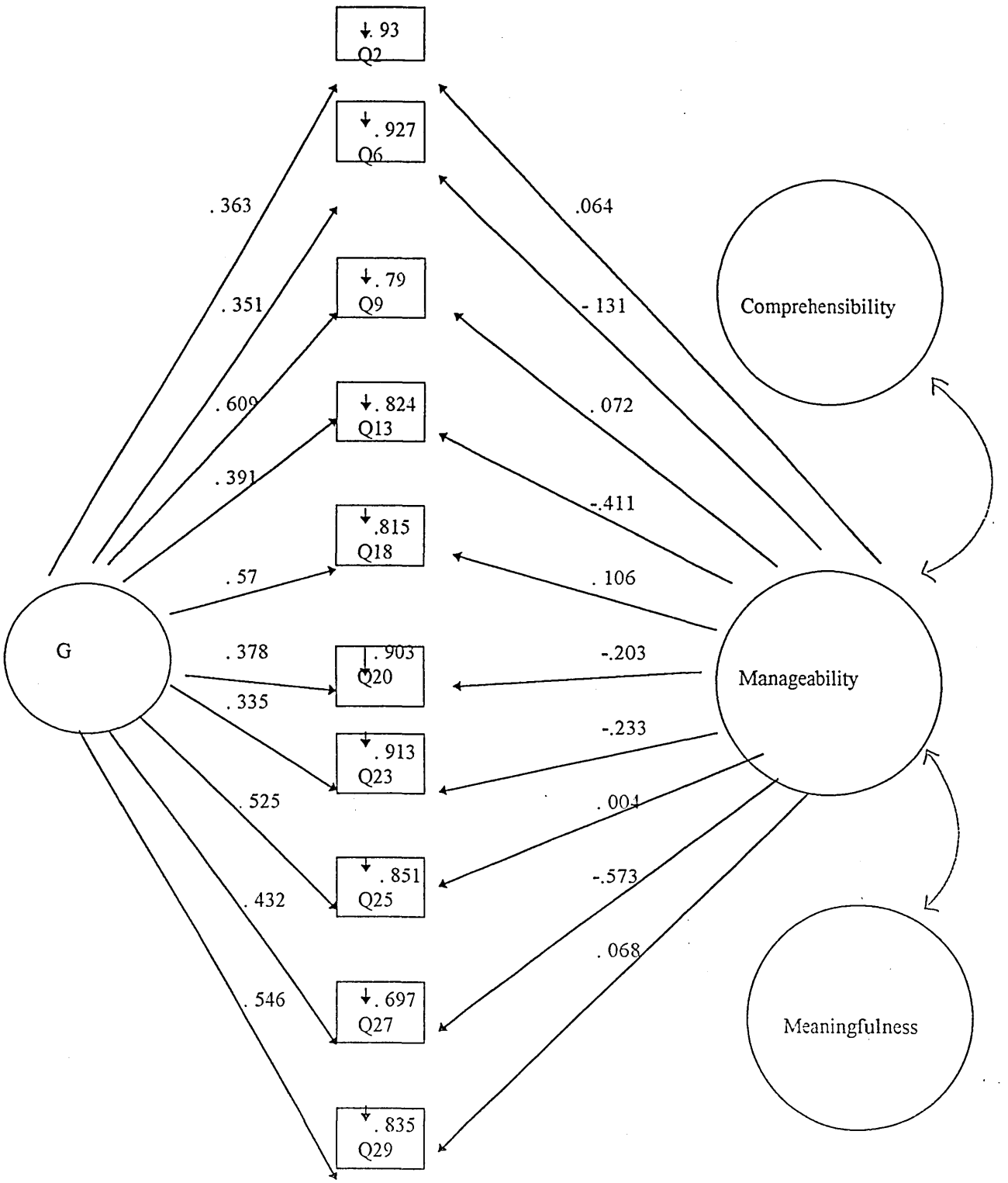


Figure.1Part 2. Loadings of Manageability and the General Sense of Coherence Factor on the Items Considered by Antonovsky (1987) to Comprise the Dimension of Manageability.

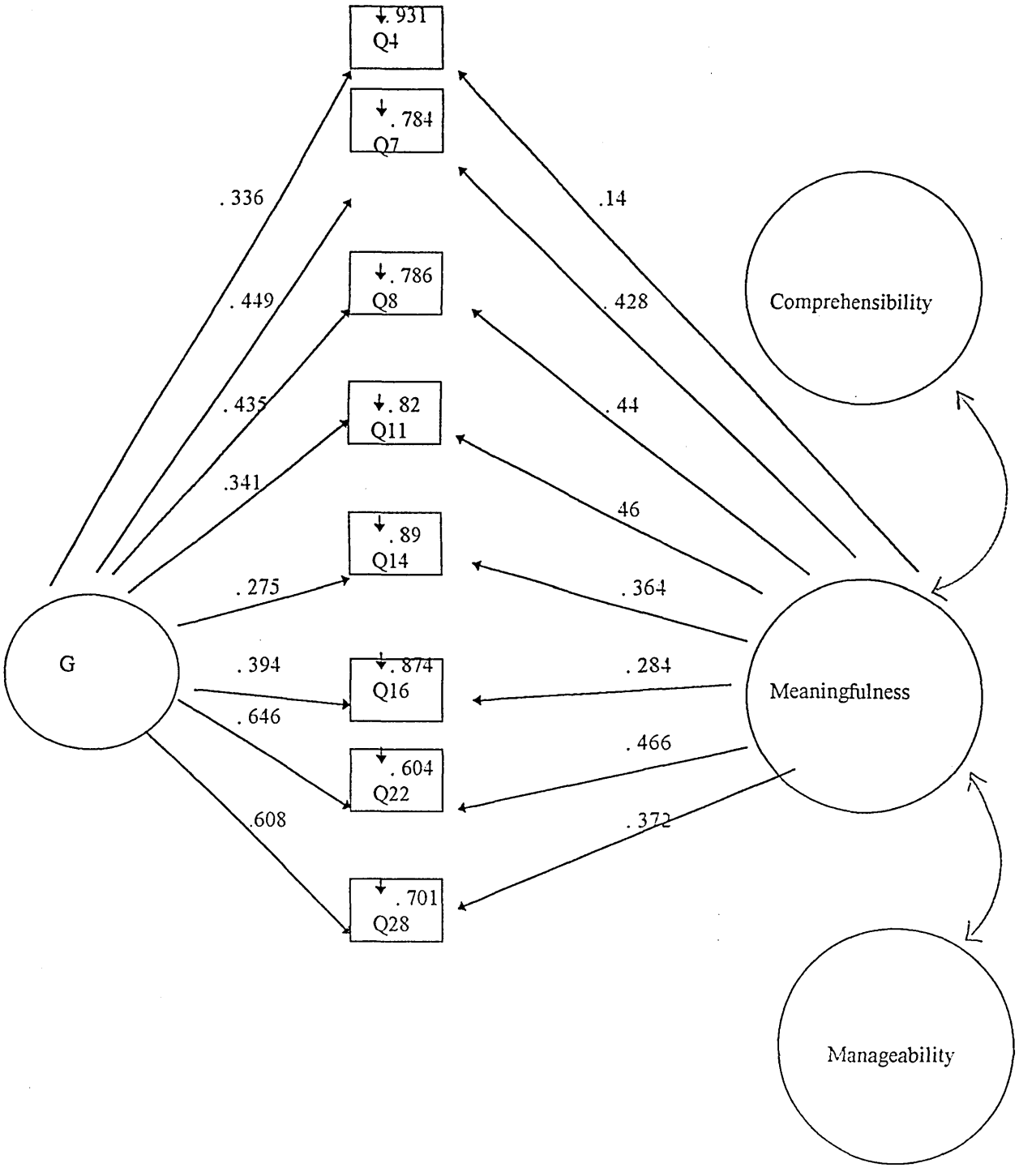
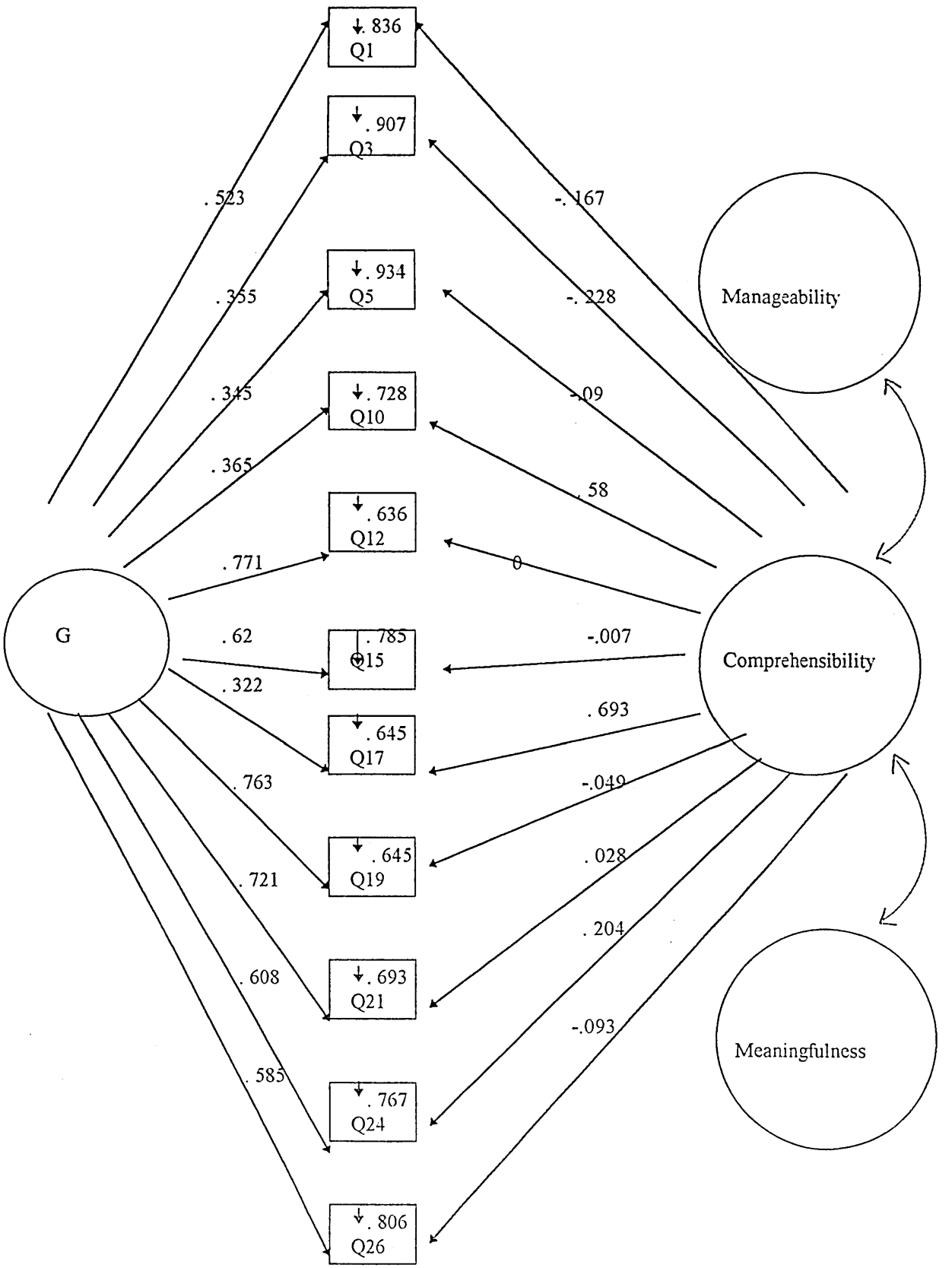


Figure 1 Part 3. Loadings of Meaningfulness and the General Sense of Coherence Factor on the Items Considered by Antonovsky (1987) to Comprise the Dimension of Meaningfulness.

Figure 2 Part 1. Loadings of Comprehensibility and the General Sense of Coherence Factor on the Items Considered by Antonovsky (1987) to Comprise the Dimension of Comprehensibility. Using the Open University Male Group. (Next Page)


. 836
Q1
. 907
Q3
. 934
Q5
. 728
Q10
. 636
Q12
. 785
Q15
. 645
Q17
. 645
Q19
. 693
Q21
. 767
Q24
. 806
Q26
G
Manageability
Comprehensibility
Meaningfulness
. 523
. 355
. 345
. 365
. 771
. 62
. 322
. 763
. 721
. 608
. 585
-. 167
-. 228
-.09
. 58
0
-.007
. 693
-.049
. 028
. 204
-.093

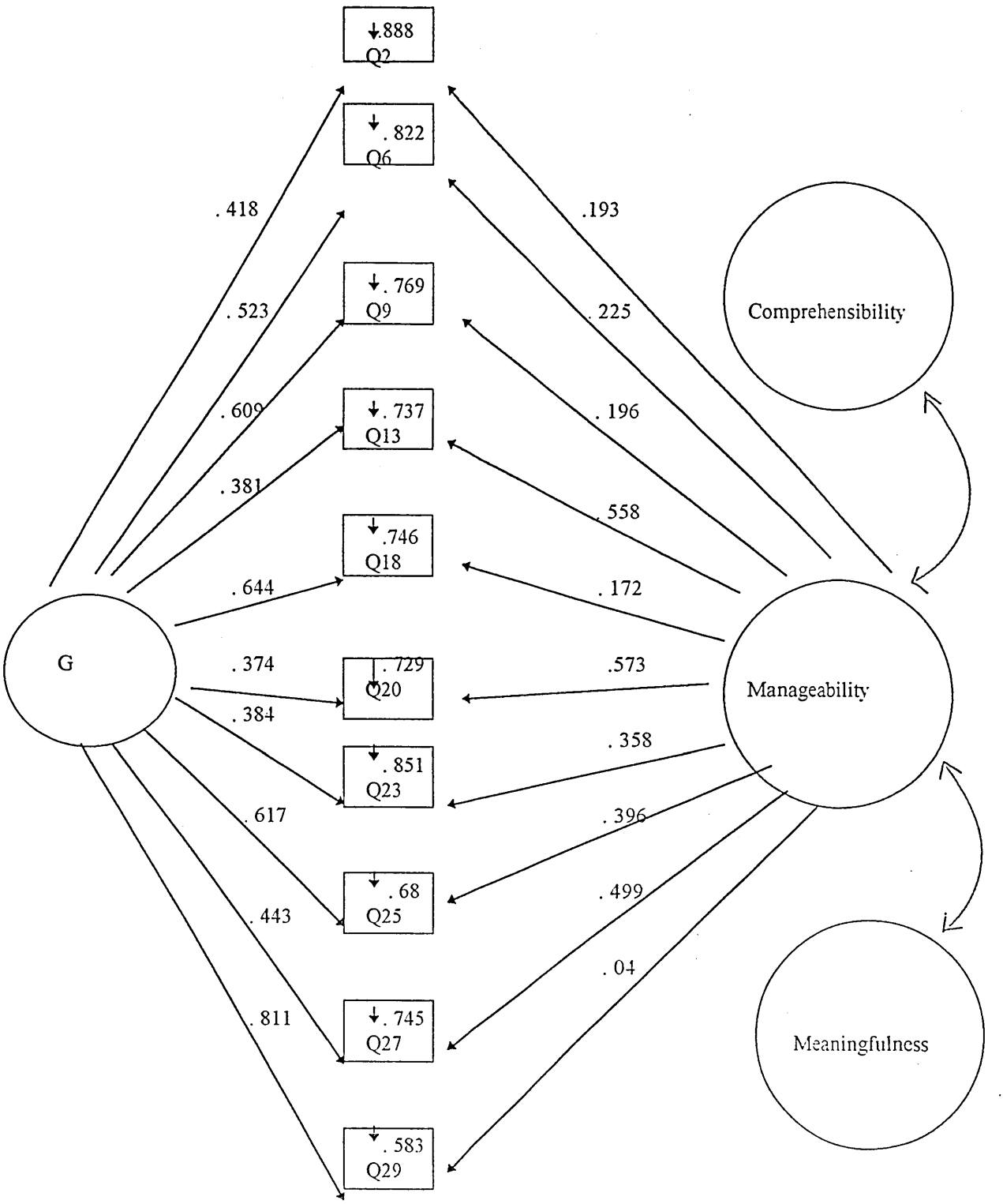


Figure 2 Part 2. Loadings of Manageability and the General Sense of Coherence Factor on the Items Considered by Antonovsky (1987) to Comprise the Dimension of Manageability.

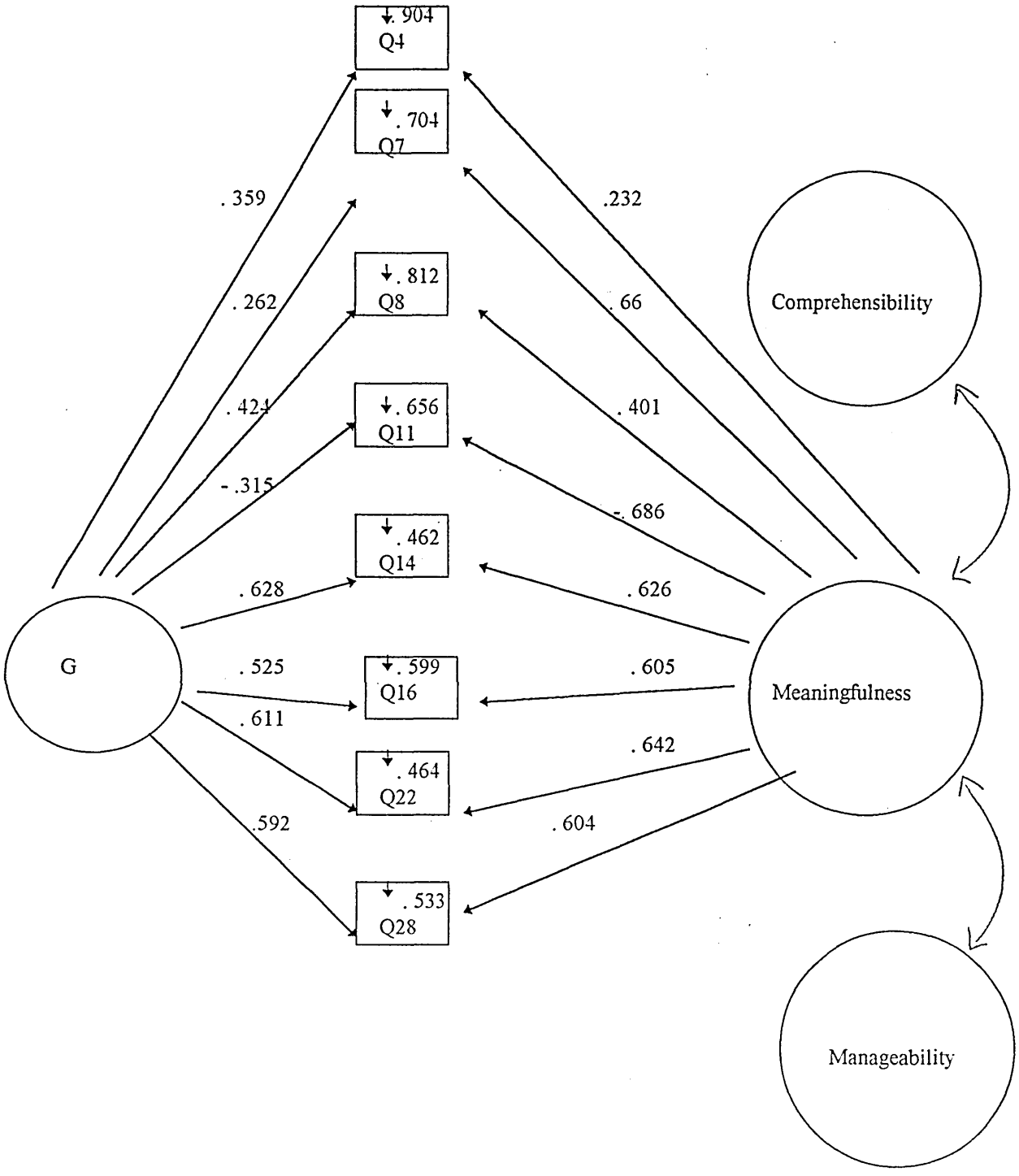


Figure 2 Part 3. Loadings of Meaningfulness and the General Sense of Coherence Factor on the Items Considered by Antonovsky (1987) to Comprise the Dimension of Meaningfulness.

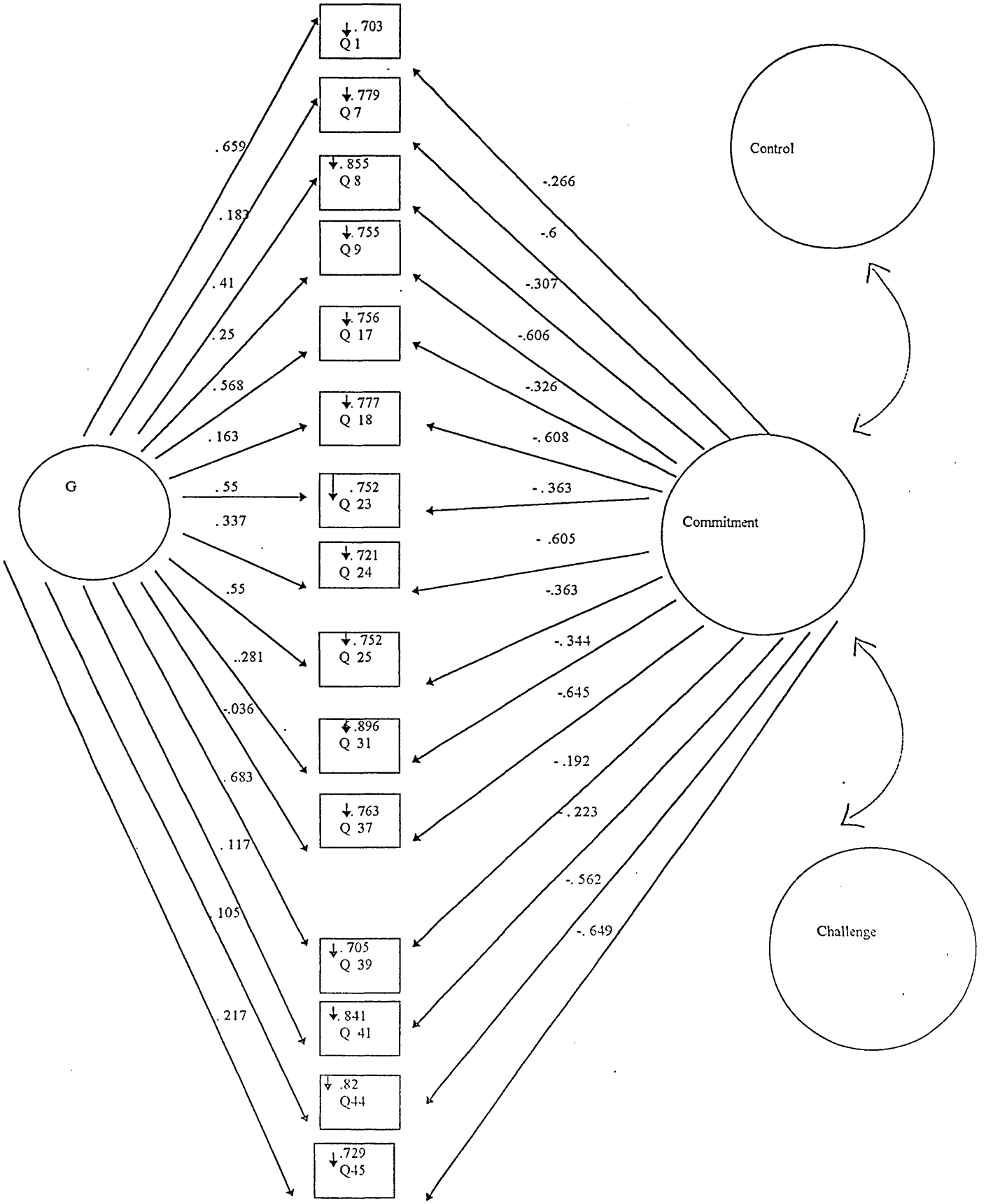
Figure 3 Part 1. Loadings of Commitment and the General Hardiness Factor on the Items Considered by Bartone et al. (1989) to Comprise the Dimension of Commitment, Using The Open University Male Group. (Next Page)

*Note as the EQS program was unable to calculate the fit of this model for the Aberdeen Male Group this is not reported.

Graphical representation of a confirmatory factor analytic model in which the Dispositional Resilience Scale simultaneously has three related factors; Commitment, Control and Challenge and one general factor. Due to the number of items in the scale (manifest variables) it was not possible to represent this on one page. The factor loadings of Commitment, Control and Challenge on their respective items are therefore presented separately over 3 pages.

Part 1 represents the loadings of Commitment, part 2 represents the loadings of Control and part 3 represents the loadings of Challenge on the manifest variables. The details of the loadings of the general factor on the items which constitute each separate dimension are present in each part of the figure.

The latent variables are represented as circles; G = general. The manifest variables are represented as squares. The numbers above each arrow pointing from the latent variables to the manifest variables represent the standardised loadings of each manifest variable on its respective latent variable. Each manifest variable also has an error component; these are presented alongside the arrows which appear above each manifest variable.


.703
Q 1
.779
Q 7
.855
Q 8
.755
Q 9
.756
Q 17
.777
Q 18
.752
Q 23
.721
Q 24
.752
Q 25
.896
Q 31
.763
Q 37
.705
Q 39
.841
Q 41
.82
Q44
.729
Q45
.659
.183
.41
.25
.568
.163
.55
.337
.55
..281
-.036
.683
.117
.105
.217
-.266
-.6
-.307
-.606
-.326
-. 608
-. 363
- .605
-.363
-. 344
-.645
- .192
-. 223
-. 562
-. 649
G
Commitment
Control
Challenge

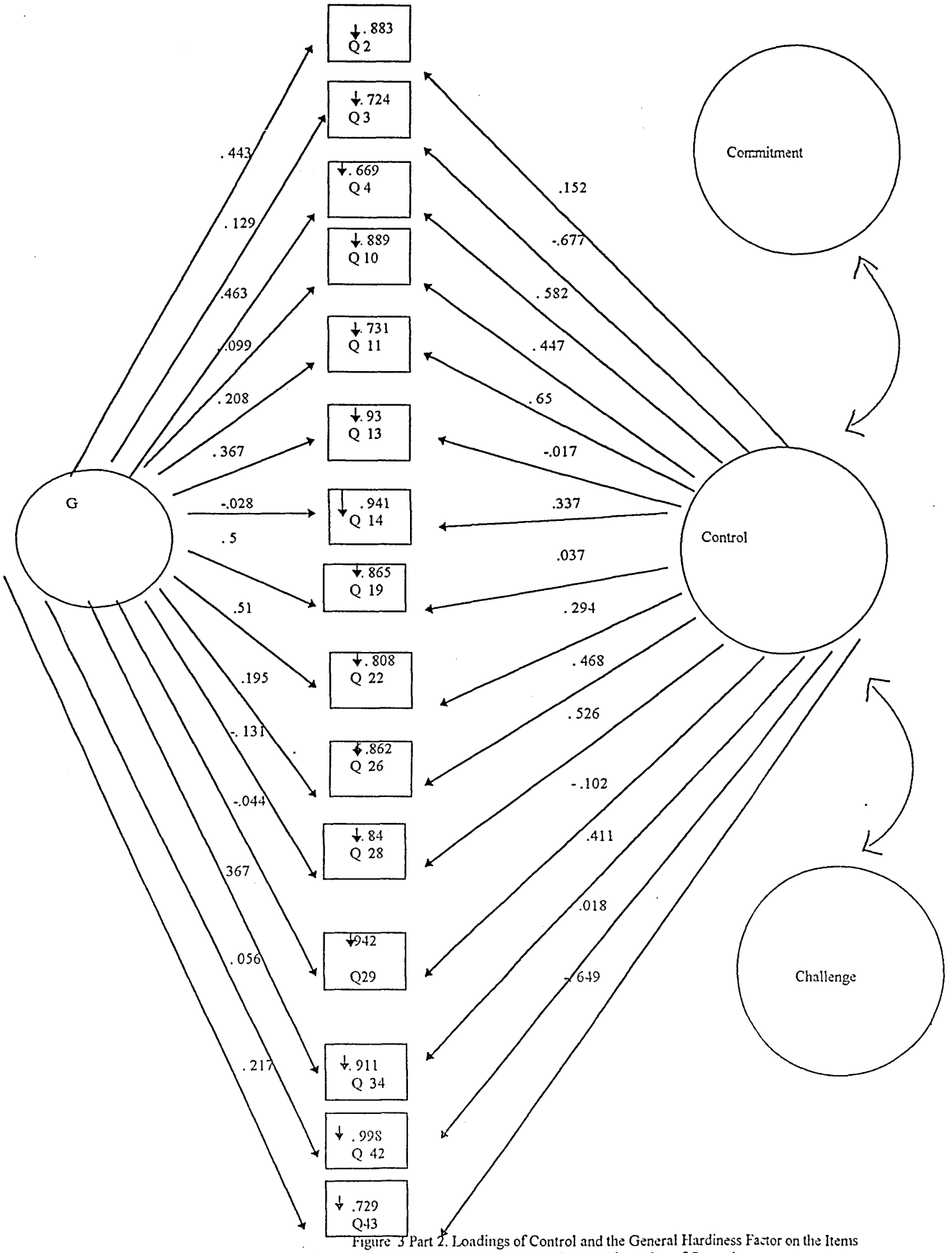


Figure 3 Part 2. Loadings of Control and the General Hardiness Factor on the Items Considered by Bartone et al. (1989) to Comprise the Dimension of Control.

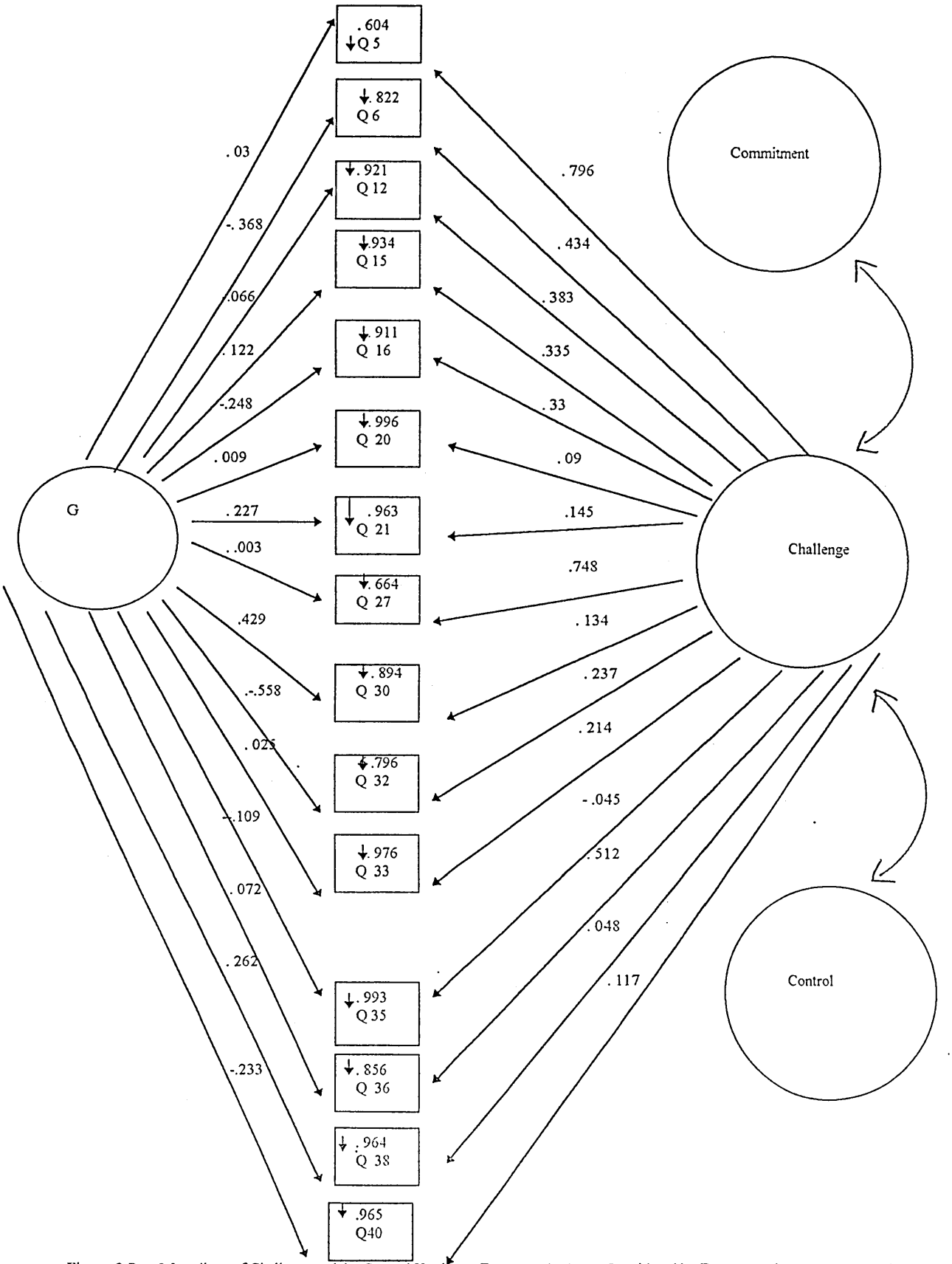


Figure 3 Part 3 Loadings of Challenge and the General Hardiness Factor on the Items Considered by Bartone et al. (1989) to Comprise the Dimension of Challenge.

Table 1 Multivariate Lagrange Multiplier Test (For Adding Parameters)
In Relation to the Sense of Coherence Questionnaire

Step	Parameter	Chi-Square	df	Probability	Chi-Square	Probability
Aberdeen Males, N = 156)						
1	V15,F3	8.64	1	.003	8.64	.003
2	V17,F2	13.02	2	.001	4.39	.04
3	V3,F2	17.28	3	.001	4.25	.04
4	V10,F3	21.32	4	.0009	4.04	.04
(Open University Males, N = 108)						
1	V8,F1	6.1	1	.01	6.1	.01
2	V11,F2	10.5	2	.005	4.4	.04
(Open University Females, N = 180)						
1	V23,F1	6.29	1	.01	6.29	.01
2	V8,F1	11.32	2	.01	5.03	.02
3	V27,F3	16.03	3	.001	4.71	.03
4	V9,F3	20.8	4	.0009	4.76	.03

Note: F1 = Comprehensibility; F2 = Manageability; F3 = Meaningfulness; V 'X' = Qusetion 'X' from the Sense of Coherence Questionnaire.

Table 3: Wald Test (For Dropping Parameters) In Relation To The Sense of Coherence Questionnaire (Open University Female Group)

Step	Parameter	Chi-Square	df	Probability	Chi-Square	Probability
1	V19,F1	0	1	.99	0	.98
2	V25,F2	0	2	.99	0	.97
3	V3,F1	.3	3	.96	.3	.59
4	V2,F2	.76	4	.94	.46	.5
5	V29,F2	1.77	5	.94	.53	.47
6	V9,F2	2.29	6	.94	.53	.47
7	V15 ,F1	3.09	7	.93	.79	.37
8	V21,F1	3.82	8	.92	.73	.39
9	V12,F2	4.87	9	.9	1.05	.3
10	V18,F2	6.19	10	.86	1.32	.25
11	V26 ,F1	7.46	11	.83	1.26	.26
12	V1,F1	9.37	12	.75	1.91	.17
13	V5,F1	11.37	13	.66	2.01	.16
14	V6 ,F2	13.62	14	.55	2.25	.13
15	V4,F3	16.24	15	.44	2.62	.11
16	V17,F4	18.94	16	.33	2.7	.1
17	V10,F4	19.62	17	.35	.67	.41
18	F2 ,F1	22.59	18	.26	2.97	.08
19	F3,F1	25.4	19	.19	2.81	.09

Note: F1 = Comprehensibility; F2 = Manageability; F3 = Meaningfulness; F4= General Factor. V 'X' = Question 'X' from the Sense of Coherence Questionnaire.

Table 4: Wald Test (For Dropping Parameters) In Relation To The Sense of Coherence Questionnaire (Open University Male Group)

Step	Parameter	Chi-Square	df	Probability	Chi-Square	Probability
1	V12,F1	0	1	.99	0	.99
2	V15,F1	0	2	.99	0	.95
3	V21,F1	.1	3	.99	.1	.75
4	V29,F2	.45	4	.98	.34	.56
5	V19,F1	.72	5	.98	.27	.6
6	V5,F1	1.3	6	.97	.58	.45
7	V26 ,F1	1.97	7	.96	.67	.41
8	V1,F1	4.17	8	.84	2.2	.14
9	V18,F2	7.19	9	.62	3.02	.08
10	V2 ,F2	10.03	10	.44	2.85	.09
11	V9 ,F2	13.04	11	.29	3.01	.08
12	V3,F1	16.27	12	.18	3.23	.07
13	V6,F2	19.66	13	.1	3.39	.07
14	F3,F1	23.38	14	.05	3.72	.05

Note: F1 = Comprehensibility; F2 = Manageability; F3 = Meaningfulness; V 'X' = Question 'X' from the Sense of Coherence Questionnaire.

Table 5: Multivariate Lagrange Multiplier Test (For Adding Parameters)
In Relation to the Dispositional Resilience Scale (Open University Male Group)

Step	Parameter	Chi-Square	df	Probability	Chi-Square	Probability
1	V16,F2	21.96	1	0	21.96	0
2	V2,F3	37.21	2	0	15.25	0
3	V38,F1	50.48	3	0	13.26	0
4	V12,F1	63.86	4	0	13.38	0
5	V33,F2	73.49	5	0	9.63	0
6	V34,F3	77.88	6	0	4.39	.04

Note: F1 = Commitment; F2 = Control; F3 = Challenge; F4= General Factor; V 'X' = Question 'X' from the Dispositional Resilience Scale.

Table 6: Multivariate Lagrange Multiplier Test (For Adding Parameters)
In Relation to the Dispositional Resilience Scale (Open University Female Group)

Step	Parameter	Chi-Square	df	Probability	Chi-Square	Probability
1	V35,F2	20.6	1	0	20.6	0
2	V12,F2	38.31	2	0	17.72	0
3	V20,F2	52.97	3	0	14.65	0
4	V36,F2	65.97	4	0	13.01	0
5	V21,F2	78.09	5	0	12.12	0
6	V15,F2	88.98	6	0	10.88	0
7	V44,F2	98.98	7	0	10	0
8	V42,F1	108.91	8	0	9.93	0
9	V26,F1	118.63	9	0	9.7	0
10	V40,F1	128.2	10	0	9.57	0
11	V6,F1	137.26	11	0	9.06	0
12	V37,F2	145.48	12	0	8.22	0
13	V13,F3	153.09	13	0	7.6	.01
14	V7,F2	160.18	14	0	7.09	.01
15	V38,F2	166.89	15	0	6.7	.01
16	V37,F3	173.25	16	0	6.35	.01
17	V2,F1	179.52	17	0	6.27	.01
18	V23,F3	184.22	18	0	4.7	.03
19	V39,F2	188.3	19	0	4.07	.04
20	V1,F2	193.08	20	0	4.78	.03
21	V30,F2	198.09	21	0	5.02	.02

Note: F1 = Commitment; F2 = Control; F3 = Challenge; F4= General Factor; V 'X' = Question 'X' from the Dispositional Resilience Scale.

Table 7 Wald Test (For Dropping Parameters) In Relation To The Dispositional Resilience Scale (Open University Males)

Open University Males, N = 108)

Step	Parameter	Chi-Square	df	Probability	Chi-Square	Probability
1	V27,F4	.01	1	.981	0	.98
2	V20,F4	.01	2	.99	0	.94
3	V13,F2	.03	3	.99	.02	.88
4	V42,F2	.06	4	1	.03	.86
5	V34,F2	.1	5	1	.04	.84
6	V33,F4	.14	6	1	.05	.83
7	V5,F4	.21	7	1	.06	.81
8	V14,F4	.32	8	1	.12	.73
9	V38,F4	.48	9	1	.16	.69
10	V19 ,F2	.66	10	1	.18	.67
11	V37,F4	.83	11	1	.17	.68
12	V29,F4	.97	12	1	.14	.7
13	V35,F3	1.13	13	1	.16	.68
14	V42 ,F4	1.41	14	1	.27	.6
15	V36,F4	1.84	15	1	.43	.51
16	V12,F4	2.37	16	1	.53	.46
17	V20,F3	3.05	17	1	.68	.41
18	V35,F4	4.04	18	1	.99	.32
19	V10,F4	5.09	19	.99	1.05	.3
20	V44,F4	6.17	20	.99	1.07	.3
21	V15,F4	7.3	21	.99	1.13	.29
22	V40,F3	8.42	22	.99	1.13	.29
23	V3,F4	9.59	23	.99	1.16	.28

Table 7 continued :Wald Test (For Dropping Parameters) In Relation To The Dispositional Resilience Scale (Open University Males)

Step	Parameter	Chi-Square	df	Probability	Chi-Square	Probability
24	V18,F4	11.21	24	.98	1.62	.2
25	V7 ,F4	12.88	25	.97	1.62	.2
26	V41,F4	14.57	26	.96	1.67	.19
27	V26,F4	16.24	27	.95	1.69	.2
28	V11,F4	17.59	28	.94	1.66	.24
29	V45,F4	18.92	29	.92	1.35	.25
30	V9,F4	20.89	30	.89	1.33	.16
31	V21,F3	23.07	31	.85	1.96	.14
32	V30,F3	25.29	32	.79	2.18	.14
33	V2,F2	28.26	33	.7	2.22	.08
34	V21 ,F4	31.74	34	.58	2.97	.06
35	V31,F4	35.25	35	.46	3.48	.06
36	V33,F3	38.96	36	.34	3.52	.05

Note: F1 = Commitment; F2 = Control; F3 = Challenge; F4= General Factor; V 'X' = Question 'X' from the Dispositional Resilience Scale.

Table 8 Wald Test (For Dropping Parameters) In Relation To The Dispositional Resilience Scale (Open University Female Group)

Step	Parameter	Chi-Square	df	Probability	Chi-Square	Probability
1	V15,F3	0	1	.93	0	.93
2	V6,F4	.02	2	.99	.01	.91
3	V39,F1	.04	3	.99	.02	.89
4	V34,F2	.06	4	1	.02	.89
5	V35,F4	.1	5	1	.04	.83
6	V28,F2	.17	6	1	.07	.8
7	V30,F3	.27	7	1	.1	.75
8	V35,F3	.37	8	1	.1	.75
9	V12,F3	.48	9	1	.1	.74
10	V9,F1	.67	10	1	.19	.66
11	V31,F1	.88	11	1	.21	.65
12	V32,F4	1.1	12	1	.22	.64
13	V37,F1	1.35	13	1	.25	.62
14	F3 ,F2	1.59	14	1	.25	.62
15	F44,F1	1.95	15	1	.36	.55
16	V14,F2	2.34	16	1	.39	.53
17	V4,F2	2.81	17	1	.46	.49
18	V7,F1	3.36	18	1	.56	.45
19	V40,F4	4.02	19	1	.65	.42
20	V38,F3	4.69	20	1	.67	.41
21	V41,F1	5.52	21	1	.83	.36
22	V18,F1	6.4	22	1	.88	.35
23	V28,F4	7.4	23	1	1.05	.31

Table 8 continued :Wald Test (For Dropping Parameters) In Relation To The Dispositional Resilience Scale (Open University Female Group)

Step	Parameter	Chi-Square	df	Probability	Chi-Square	Probability
24	V21,F4	8.62	24	1	1.17	.28
25	V42 ,F4	9.86	25	1	1.24	.27
26	V43,F4	11.22	26	.99	1.36	.24
27	V16,F4	12.65	27	.99	1.43	.23
28	F3,F1	14.37	28	.98	1.72	.19
29	V29,F2	16.15	29	.97	1.78	.18
30	V11,F2	18.1	30	.96	1.95	.16
31	V24,F1	20.05	31	.93	1.947	.16
32	V16,F3	22.15	32	.9	2.1	.15
33	V26,F2	24.27	33	.86	2.11	.15
34	V20 ,F4	26.54	34	.81	2.27	.13
35	V3,F2	29.07	35	.75	2.53	.11
36	V1,F1	31.9	36	.66	2.84	.09
37	V21,F3	35.6	37	.53	3.7	.05

Note: F1 = Commitment; F2 = Control; F3 = Challenge; F4= General Factor; V 'X' = Question 'X' from the Dispositional Resilience Scale.

APPENDIX XIV: PUBLICATION BASED ON PILOT STUDY AND STUDY 2

APPENDIX XV: PUBLICATION BASED ON STUDY 3

The two published papers cited below have been removed from the e-thesis due to copyright restrictions:

Gibson, L. M., & J., M. (1996). Neuroticism and Sense of Coherence. Psychological Reports, 79(1), 343–349. https://doi.org/10.2466/pr0.1996.79.1.343

Gibson, L. M., & J., M. (1997). Do Health Questionnaires Which Do Not Consider Sex Differences Miss Important Information? Psychological Reports, 81(1), 163–171. https://doi.org/10.2466/pr0.1997.81.1.163